FPE Interface

Technical Specifications

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Revision A
November 2006

Revision History

Changes to the original manual are listed below.

Change	Date	Description
-01 Rev A	11/2006	Initial Symbol Release (Hypercom Version 3.23)

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ABOUT THIS GUIDE

Introduction

This guide provides the events and methods initiated by the Symbol FPE Server.
This guide is intended for network administrators, merchants, operators, technicians or those who oversee the configuration and daily maintenance of the terminals

✓ **NOTE:** Screens and windows pictured in this guide are samples and can differ from actual screens.

! **IMPORTANT:** This guide includes information about the events and methods initiated by the FPE Server, a Symbol OEM product from Hypercom Corporation.

Any references in this guide to Hypercom Corporation, Hypercom logo, Hypercom file names and file paths, Hypercom software and terminals reflect hardware and software manufactured by Hypercom Corporation for Symbol Technologies, Inc.

Notational Conventions

The following conventions are used in this document:
    If applicable, the term "FormBuilder" in this guide refers to software.
    Italics are used to highlight the following:
    o   Chapters and sections in this and related documents
    o   Drop-down list and list box names
    o   Check box and radio button names
    o   Icons on a screen.
    Bold text is used to highlight the following:
    o   Names of windows
    o   Dialog box components.
    bullets (•) indicate:
    o   Action items
    o   Lists of alternatives
    o   Lists of required steps that are not necessarily sequential
    Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.
    Special icons:

✓ **NOTE**: Notes contain neutral or positive information supplementing the main text. It is often information that applies only to special cases.

! **IMPORTANT:** Important statements draw attention to information crucial to using the product successfully. Pay special attention to Important statements.

! **CAUTION**: Cautions advise that a negative result, such as a loss of data, may occur.

⚡ **WARNING:** Warnings provide information that is essential to the safety of the user, the equipment, or both. Failure to do as instructed may result in physical damage.

Related Documents

For the latest version of this and all payment solutions guides, go to: http://www.symbol.com/manuals.

Service Information

For service information, warranty information, technical assistance or problems with the equipment, contact the regional Symbol Global Customer Interaction Center in your area by visiting: www.symbol.com/contactsupport . Before calling, have the model number, serial number and several bar code symbols at hand.

Call the Global Customer Interaction Center from a phone near the scanning equipment so that the service person can try to troubleshoot the problem. If the equipment is found to be working properly and the problem is reading bar codes, the Support Center will request samples of the bar codes for analysis at our plant.
If the problem cannot be solved over the phone, it may be necessary to return the equipment for servicing. If that is necessary, the Global Customer Interaction Center will provide specific directions.

✓ **NOTE**: Symbol Technologies is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty. If the original shipping container was not kept, contact Symbol to have another sent.

If the Symbol product was purchased from a Symbol Business Partner, contact that Business Partner for service.

SPECIFICATIONS

Communication Parameters (ASYNC)

19200 or 9600 Baud
No Parity
1 Stop Bit
8 Data Bits

Protocol

ASYNC
<STX><Message Type><Data><ETX><LRC>

The LRC is an XOR of each character of <Message Type> <Data> and the ETX.
All messages implemented with ACK/NAK handshaking.

TCP/IP
<FP><Message Length><Message Type><Data>

The <FP> at the start of the message is used to identify a FPE message to the host software. The Message Length field is Two Hex digits, LSB, containing the total length of the message type and data fields. FPE will respond to TCP/IP messages that do not have a response with a 'Z' TCPIP-ACK. FPE will also send TCPIP-Keep Alive message 'Y' periodically to detect the network failure if sitting idle for more than a minute. Terminal will be responsible for the Keep Alive message and Server/PC application should never send this message to the terminal.

Requests supported by terminal types

Request	Tokens	PD87xx	PD4700	PD4750
'A' (Return to Idle 'A')	All	Yes	Yes	Yes
'b' (Beeper control 'b')	-	Yes	Yes	Yes
'B' (Port command 'B')	All	Yes	Yes	Yes
'C' (MAC Data)	All	No	No	No
'D' (Directory of Files 'D')	-	Yes	Yes	Yes
'E' (Configure Tender 'E')	All	Yes	Yes	Yes
'F' (Version Information 'F')	-	Yes	Yes	Yes
'F' (Version Information 'F')	"MV", "RF".	Yes	Yes	Yes
'G' (Global Parameters 'G')	"FA", "KD", "PS", "SW".	Yes	Yes	Yes
'G' ("SP" – Screen Protector)	"SP"	Yes	No	Yes
'H' (Split Message 'H')	-	Yes	Yes	Yes

Request	Tokens	PD87xx	PD4700	PD4750
'I' (Initiate Code Download 'I')	-	Yes	Yes	Yes
'J' (Poll Customer Data 'J')	All	Yes	Yes	Yes
'K' (Disable/Enable Keyboard Toggle 'K')	-	No	Yes	Yes
'L' (File Delete 'L')	-	Yes	Yes	Yes
'M' (Update Display 'M')	"C1" - "C30"	Yes	Yes	Yes
'M' (Update Display)	"DL"	Yes	Yes	Yes
'N' (Clear All Display Lines 'N')	-	Yes	Yes	Yes
'P' (File Load 'P')	-	Yes	Yes	Yes
'p' (Setup Parameters 'p')	All	Yes	Yes	Yes
'Q' (Form Information 'Q')	All	Yes	Yes	Yes
'S' (Terminal Status 'S')	-	No	No	No
'T' (Terminal Type 'T')	-	Yes	Yes	Yes
'V' (Form Request)	"C1" - "C30"	Yes	Yes	Yes
'V' (Form Request)	"P1" - "P7"	Yes	Yes	Yes
'V' (Form Request)	"AC", "DL", "ET", "FN", "M#", "SP", "SM", "ST", "SU", "TK", "WK".	Yes	Yes (no signature capture)	Yes
'V' (Form Request)	"D#"	Yes	Yes	Yes
'V' (Form Request)	"B0" - "B9", "DT", "EF", "E0" - "E9", "SB", "SS", "TS".	Yes	Yes (no signature capture)	Yes
'V' (Form Request)	"HP"	No	No	No
'@' (Hardware Reset)	-	Yes	Yes	Yes
'^' (Set NMS IPConfig '^')	All	No	No	No
'_' (Keyboard Lock '_')	-	No	Yes	Yes

Terminal Type Codes

PD8700	'7'	0x37
PD4700	'A'	0x41
PD4750	'B'	0x42

Key Codes and Tender Type Codes

FuncKey1	Credit	'A'	0x41
FuncKey2	Debit	'B'	0x42
FuncKey3	EBT	'C'	0x43
FuncKey4	EBTFoodStamps	'D'	0x44
FuncKey5	EBTCashBenefits	'E'	0x45
FuncKey6	Check	'F'	0x46
FuncKey7	User1	'G'	0x47
FuncKey8	User2	'H'	0x48
FuncKey9	User3	'I'	0x49
FuncKey10	User4	'J'	0x4A
Screen_Menu_One		'K'	0x4B
Screen_Menu_Two		'L'	0x4C
Screen_Menu_Three		'M'	0x4D
Screen_Menu_Four		'N'	0x4E
Screen_Menu_Five		'O'	0x4F
Screen_Menu_Six		'P'	0x50
Cancel		'Q'	0x51

Customer activated states

Idle	'A'	0x41
MSR	'B'	0x42
Tender	'C'	0x43
PIN	'D'	0x44
Cash Back	'E'	0x45
Purchase Balance	'F'	0x46
Cash Back Yes/No	'G'	0x47
Wait	'H'	0x48
Select EBT	'I'	0x49
Not In Customer Activated Mode	'J'	0x4A
Frequent Shopper	'K'	0x4B

Message Type Codes

Return to Idle	'A'	0x41
Port command	'B'	0x42
MAC Data	'C'	0x43
Directory of files	'D'	0x44
Configure Tender	'E'	0x45
Form Request	'V'	0x56
Global Parameters	'G'	0x47
Split Message	'H'	0x48
Initiate Code Download	'I'	0x49
Poll Customer Data	'J'	0x4A
Disable/enable Keyboard	'K'	0x4B
File Delete	'L'	0x4C
Update Display	'M'	0x4D
Clear all Display Lines	'N'	0x4E
File Load	'P'	0x50
Form Information	'Q'	0x51
Terminal Status	'S'	0x53
Terminal Type	'T'	0x54
Version Information	'F'	0x46
Error Response	'X'	0x58
TCPIP-ACK	'Z'	0x5A
Keyboard_Lock	'_'	0x5F

Hardware Reset	'@'	0x40
SetNMSIPConfig	'^'	0x5E
POS Event	'`'	0x60
Upload file system	'['	0x5B
Setup Parameters	'p'	0x70
UPOS Statistics	'u'	0x75
File Upload	'd'	0x64

Return to Idle 'A'

Returns FPE to customer activated mode "idle".
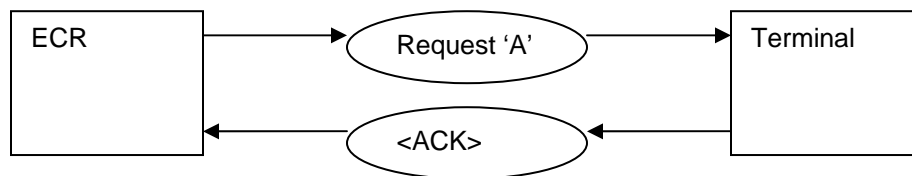
This request is processed on all types of terminals identically.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'A'
Parameters	Field tokens	varies	ASCII

Response
None.

Field tokens used in Return to Idle 'A' messages

Token	Description
FN	Idle form name
CP	Clear pole display fields
TT	Tender type field
DF	Delete Fields

✓ **NOTE:** Field tokens are in the format <FS><Field Token><Data>.

Return to Idle field token descriptions

"FN" - Form name

Field	Description	Length	Value
Token	Field ID	2	"FN"
Parameter	Form name to process	1 – 11	ASCII form name

✓ *NOTE:* If this token is included in the message this form will be displayed at the customer activated idle state instead of the default form name "IDLEFRM".

Example: <FS>FNMYIDLEFRM

"CP" - Clear pole display fields

Field	Description	Length	Value
Token	Field ID	2	"CP"
Parameter	Clear pole display fields	1	"Y" or "N"

✓ *NOTE:* This causes any pole display lines that were set using the "Cn" token in a Form Request or Update Display message.
Example: <FS>CP

"TT" - Tender type

Field	Description	Length	Value
Token	Field ID	2	"TT"
Parameter	Tender type code (see Key Codes table)	1	ASCII

✓ *NOTE:* The tender type is needed so FPE knows the transaction flow to follow after the Form that it received.
Example: <FS>TTA

"DF" – Delete Fields

Field	Description	Length	Value
Token	Field ID	2	"DF"
Parameter	Clear pole display fields	1	"A" for Delete all Fields or "P" for Delete partial

✓ *NOTE:* If "DF" has a "P" parameter, Sub-field tokens are in the format <FS><Field Token><FS>

Token	Description
T	Track data
PD	PIN data

Token	Description
TT	Tender type
FS	Current FPE customer activated state
CB	Cash back amount
F	Frequent shopper track data

✓ **NOTE:** This token is needed to know if FPE needs to clear the customer data previously obtained.

Example: <FS>DFP<FS>TT<FS>F<FS>T<FS>CB<FS>

Return to Idle example -

Request:
<STX>A<FS>FNMYIDLEFRM<FS>CPY<FS>TTA<FS>DFA<ETX><LRC>
<STX>A<FS>FNMYIDLEFRM<FS>CPY<FS>TTA<FS>DFP<FS>TT<FS>F<FS>T <ETX><LRC>
FPE does not respond other than the protocol ACK.
Response:
None

Port command 'B'

Used to configure a pass-through port and send or receive data from that port. It allows ECR to communicate with any device connected to the terminal.

This request is processed on all types of terminals.

Open port
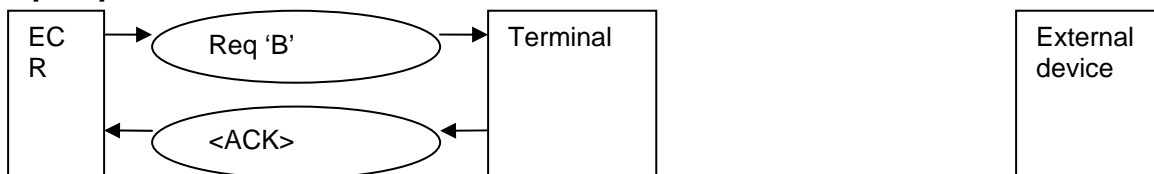
Write data
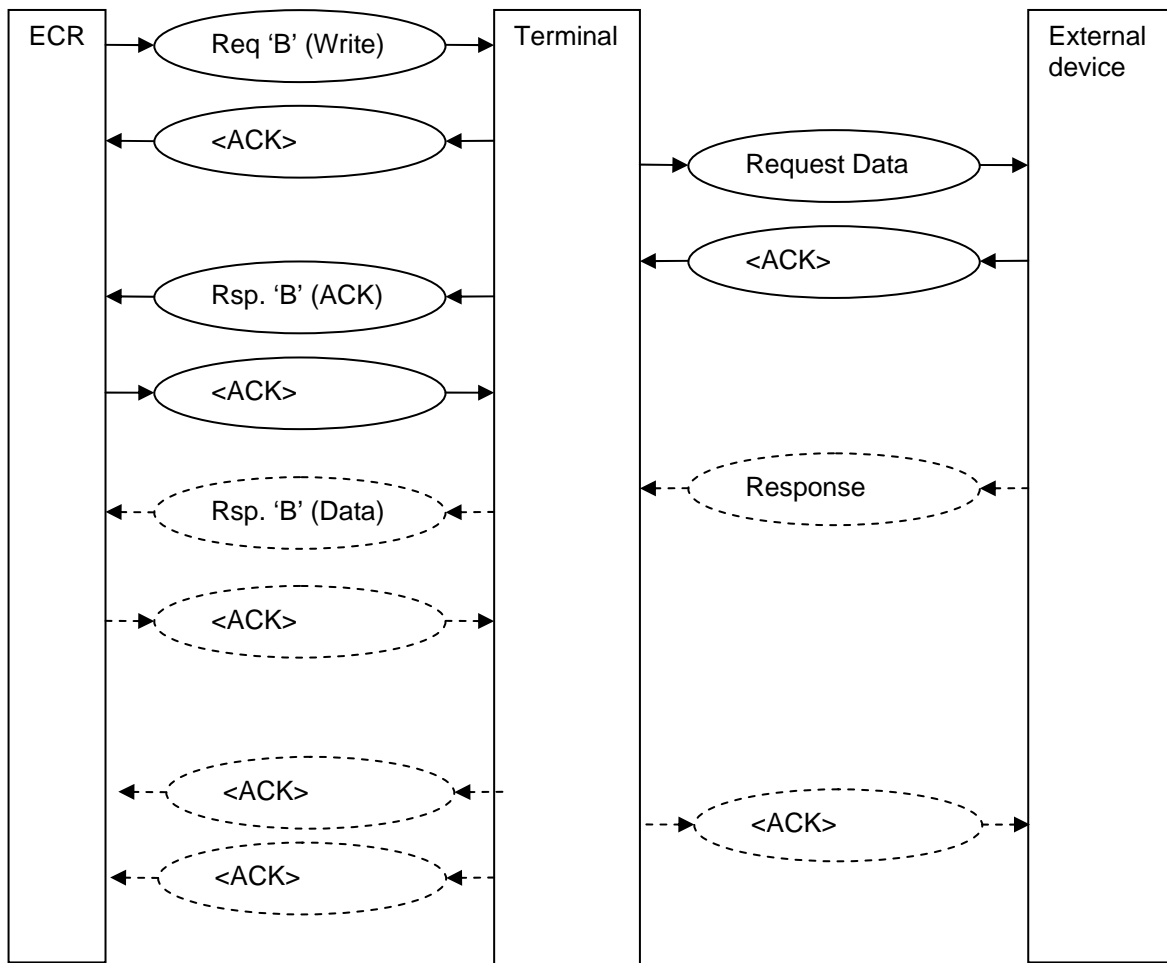
Close port
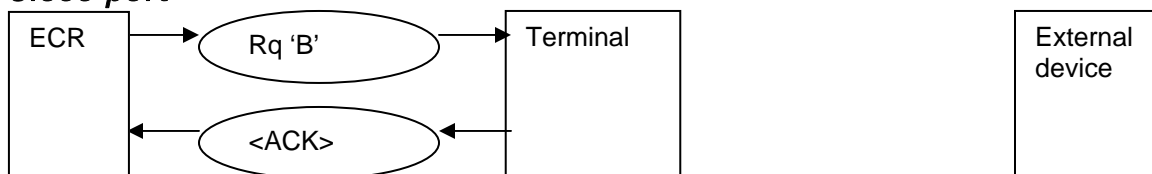
The following terminal's ports can be used with the Port command as a source and destination ports:

Platform	Active ECR Port	External device port
PD8700	RS232-1, Ethernet or USB	'1' - RS232-1, '2' - RS232-2
PD4700	Ethernet or USB	'1' - RS232-1
PD4750	Ethernet or USB	'1' - RS232-1

✓ *NOTE:* The same port cannot be used simultaneously as ECR port and an external device port. PD87xx terminals equipped with Contactless card reader use the COM2 port internally to communicate with the Contactless card reader, so the COM2 port is not available for port command ('B') in this case.

The following picture shows possible port usage variants for PD87xx terminals
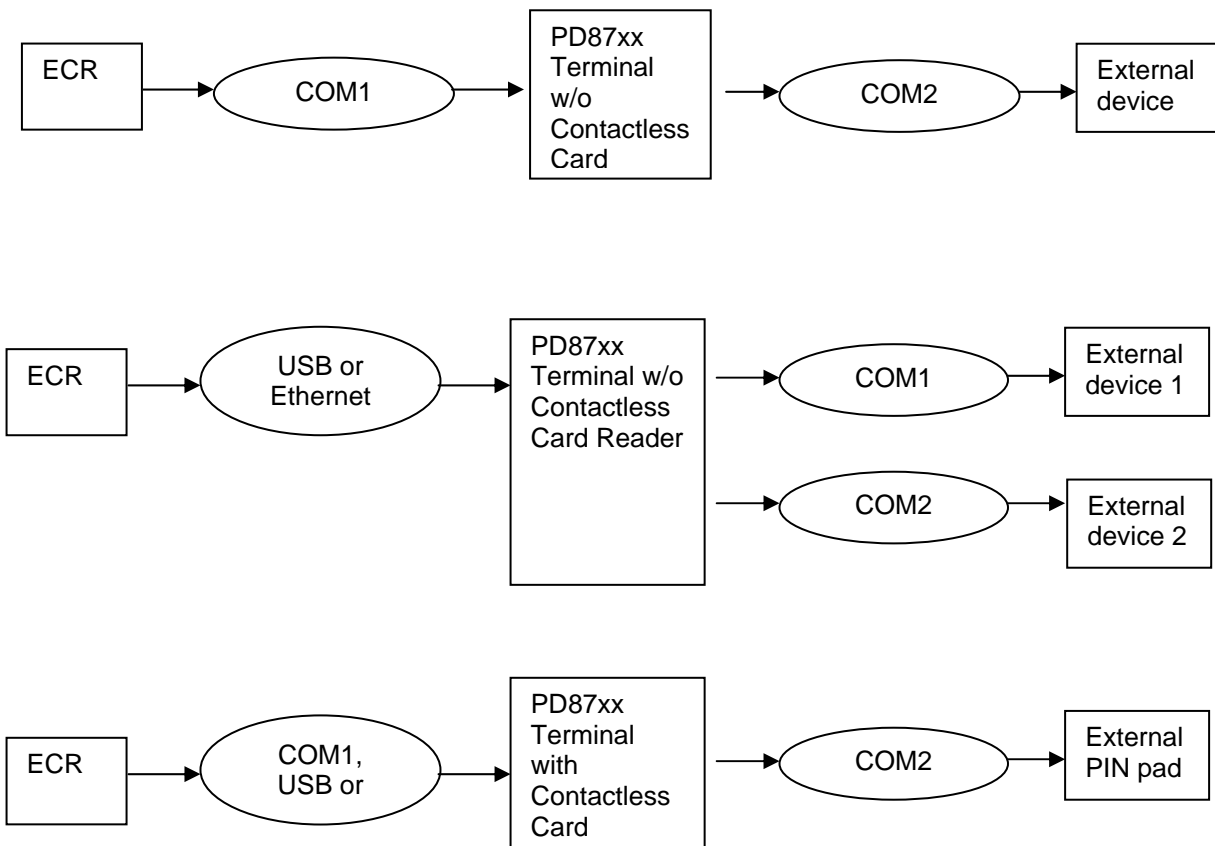
* Supported on PD8700 (also called PD87xx in this document) starting from release 3.0.010

Request

Field	Description	Length	Value
Message Type	Message ID	1	"B"
Parameters	Field tokens	varies	ASCII

Response

Field	Description	Length	Value
Message Type	Message ID	1	"B"
Parameters	Field tokens	varies	ASCII

Field tokens used in Port command 'B' messages

✓ *NOTE:* Field tokens are in the format <FS><Field Token><Data>

Token	Description
PN	Port number
AC	Action
BR	Baud rate
CP	Configuration parameters
DT	Data to send to or received from the port

Port command field token descriptions

"PN" - Port number

Field	Description	Length	Value
Token	Field ID	2	"PN"
Parameter	Port number	1	'1' - RS232-1, '2' - RS232-2, '3' - RS232-3, '4' - Pin

Example: <FS>PN2

"AC" - Action

Field	Description	Length	Value
Token	Field ID	2	"AC"
Parameter	Action to take	1	'O'pen, 'C'lose, 'W'rite

Example: <FS>ACO

"BR" - Baud rate

Field	Description	Length	Value
Token	Field ID	2	"BR"
Parameter	Baud rate	1	'1' - 300 '2' - 1200 '3' - 2400 '4' - 4800 '5' - 9600 '6' - 19200

Example: <FS>BR6

✓ *NOTE:* Must be sent when Action is Open.

"CP" - Configuration parameters

Field	Description	Length	Value
Token	Field ID	2	"CP"

Field	Description	Length	Value
Parameter	Port configuration	1	'1' - 7N1 (7 data, No parity, 1 stop) '2' - 7O1 (7 data, Odd parity, 1 stop) '3' - 7E1 (7 data, Even parity, 1 stop) '4' - 7N2 (7 data, No parity, 2 stop) '5' - 7O2 (7 data, Odd parity, 2 stop) '6' - 7E2 (7 data, Even parity, 2 stop) '7' - 8N1 (8 data, No parity, 1 stop) '8' - 8O1 (8 data, Odd parity, 1 stop) '9' - 8E1 (8 data, Even parity, 1 stop) 'A' - 8N2 (8 data, No parity, 2 stop) 'B' - 8O2 (8 data, Odd parity, 2 stop) 'C' - 8E2 (8 data, Even parity, 2 stop)

Example: <FS>CP7

✔ *NOTE:* Must be sent when Action is Open.

"DT" - Data to send to or received from the port

Field	Description	Length	Value
Token	Field ID	2	"DT"
Parameter	Data length	3	ASCII Numeric 001 - 925
FS	Field separator	1	FS
Parameter	Data	1 - 925	Binary (values 0 – 255)

Example: <FS>DT006<FS><STX>123<ETX><LRC>

Field tokens sent by FPE in response to Port command 'B' messages

✔ *NOTE:* Field tokens are in the format <FS><Field Token><Data>

Token	Description
PN	Port number
DT	Data to send to or received from the port

Port command response field token descriptions
See descriptions for field tokens in Port command request messages.

✔ *NOTE:* See Error Response 'X' for error messages in response to Port command messages.

Port command example
Request:
(Open port 1 at 9600 8N1)
<STX>B<FS>PN1<FS>ACO<FS>BR5<FS>CP7
FPE does not respond other than the protocol ACK unless there is an error opening the port or the port is already in use as the ECR connection.

(Send data to port 1)
<STX>B<FS>PN1<FS>DT006<FS><STX>QM<CR><ETX><LRC><ETX><LRC>

(The device connected to port 1 responds with data and FPE passes it on to the ECR)

Response:
<STX>B<FS>PN1<FS>DT019<STX>MR2300 VER 1.45<CR><ETX><LRC><ETX><LRC>

✓ ***NOTE:*** Responses will be sent unsolicited by FPE anytime data is received from the device connected to the port. The ECR should be ready to receive Port command responses whenever a port is open.

MAC Data 'C'

Perform a MAC calculation on data.
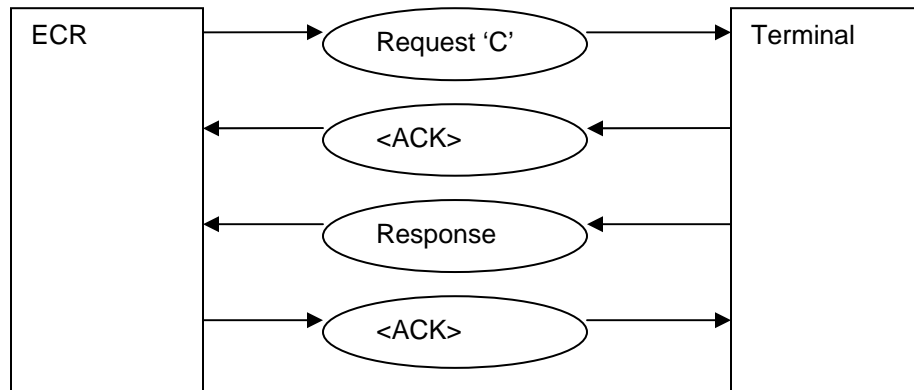
✓ *NOTE:* This token is processed on ICE terminals and may not apply to Symbol payment terminals.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'C'
Parameters	Field tokens	varies	ASCII

Response

Field	Description	Length	Value
Message Type	Message ID	1	'C'
Data	MAC value	8	ASCII hex

Field tokens used in MAC Data 'C' messages

✓ *NOTE:* Field tokens are in the format <FS><Field Token><Data>

Token	Description
'M#'	Master key index to use for MAC calculation
"MK"	Key to use for MAC calculation
"MD"	Data to be MACed

MAC Data field token descriptions

'M#' - Master key index

Field	Description	Length	Value
Token	Field ID	2	'M#'
Parameter	Master key number to use for MAC calculation	1	ASCII numeric (1 - 9)

Example: <FS>M3

"MK" - MAC Key

Field	Description	Length	Value
Token	Field ID	2	"MK"
Parameter	MAC key to use for MAC calculation	16	ASCII hex

Example: <FS>MK20AFBD34AA23F0D8

"MD" - MAC Data

Field	Description	Length	Value
Token	Field ID	2	"MD"
Parameter	Length of data	3	ASCII numeric 001 - 400
Parameter	Data to be MACed	1 - 400	Binary (values 0 – 255)

Example: <FS>MD016Data to be MACed

MAC data example -
Request:
<STX>C<FS>M#3<FS>MK20AFBD34AA23F0D8<FS>MD016Data to be MACed<ETX><LRC>

FPE responds with an eight digit ASCII Hex MAC value.

Response:
<STX>CFE27E632<ETX><LRC>

✓ **NOTE:** If the MAC key token is not used, the MAC will be calculated using the Master key selected by the Master key index token. If the MAC key token is used, it is assumed to be the MAC working key encrypted under the Master key selected by the Master key index token.

Directory of Files 'D'

Get a directory of all files contained in the terminal's file system.
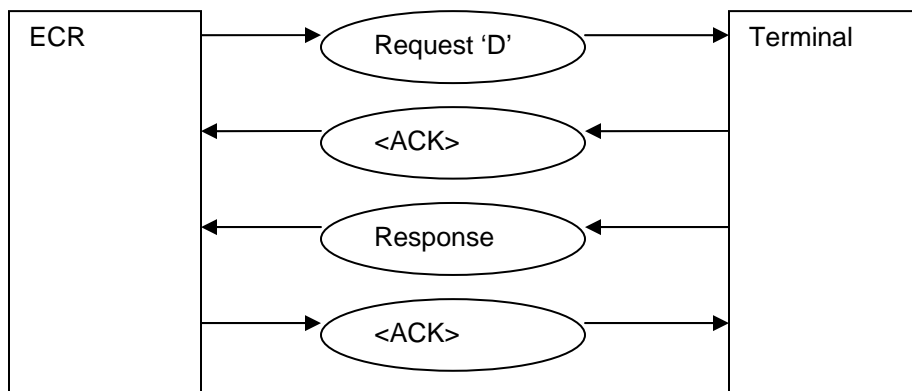
This request is processed on all types of terminals identically.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'D'

Response

Field	Description	Length	Value
Message Type	Message ID	1	'D'
Data	Remaining file memory	1 - 7	ASCII numeric
Data	List of files separated by '/'	varies	ASCII

Field tokens used in Directory of Files 'D' messages

None

Directory of files example -

Request:
 <STX>D<ETX><LRC>
FPE responds with the amount of remaining file memory and a list of all files in its file system separated by '/'.
Response:
<STX>D650345/CONFIG.SYS 2/SIGSCREEN 345/CBSCR 340<ETX><LRC>

Configure Tender 'E'

Configure a tender type.
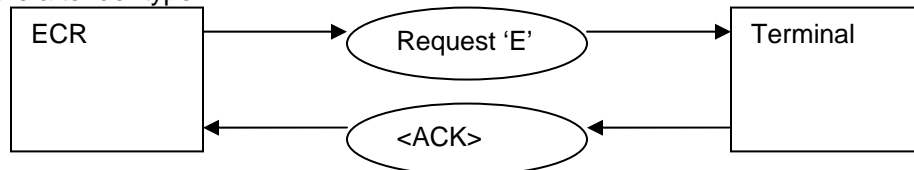
This request is processed on all types of terminals identically.

✓ **NOTE:** Only one tender type should be configured per Configure Tender message.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'E'
Parameters	Field tokens	varies	ASCII

Response

None

Field tokens used in Configure Tender - 'E' messages

✓ **NOTE:** Field tokens are in the format <FS><Field Token><Data>

Token	Description
TT	Tender type code (see Key Codes table)
RP	Resets all parameters for this tender to default values

Token	Description
CT	Cash back type ('N' - OFF, '1' - Clerk, '2' - Keyboard, '3' - Buttons)
C1	Cash back prompt one
C2	Cash back prompt two
CF	Cash back form name (1 - 11 characters)
CY	Cash back Yes/No prompting on or off ('Y' or 'N')
Y1	Cash back Yes/No prompt one
Y2	Cash back Yes/No prompt two
YF	Cash back Yes/No form name (1 - 11 characters)
ET	Encryption type ('N' - None, 'M' – Master Session, 'D' - DUKPT)
M	Master key number to use for master session PIN encryption
WK	Working key for master session PIN encryption
P1	PIN prompt one
P2	PIN prompt two
PF	PIN form name (1 - 11 characters)
BY	Purchase/Balance Yes/No prompting on or off ('Y' or 'N')
B1	Purchase/Balance Yes/No prompt one
B2	Purchase/Balance Yes/No prompt two
BF	Purchase/Balance Yes/No form name (1 - 11 characters)
S1	Swipe prompt one
S2	Swipe prompt two
SF	Swipe form name (1 - 11 characters)
FS	Frequent shopper Yes/No

✓ *NOTE:* Tender type default values are - Cash back type 'N', Cash back Yes/No prompting 'N', Encryption type 'N', Purchase/Balance yes/No prompting 'N', all prompts and form names "", Frequent shopper 'N'. If used, the "RP" token should be sent as the first field token after token "TT".

Field tokens used in Configure Tender descriptions -

"TT" - Tender type

Field	Description	Length	Value
Token	Field ID	2	"TT"
Parameter	Tender type code (see Key Codes table)	1	ASCII

Example: <FS>TTA

✓ *NOTE:* This token must be the first token in the message.

"RP" - Reset parameters

Field	Description	Length	Value
Token	Field ID	2	"RP"
Parameter	None		

Example: <FS>RP

✓ *NOTE:* If used, the "RP" token should be sent as the first field token after token "TT".

"CT" - Cash back type

Field	Description	Length	Value
Token	Field ID	2	"CT"
Parameter	Cash back type ('N' - OFF, '1' - Clerk, '2' - Keyboard, '3' - Buttons)	1	ASCII

Example: <FS>CT3

"C1" - Cash back prompt one

Field	Description	Length	Value
Token	Field ID	2	"C1"
Parameter	Cash back prompt one	varies	ASCII

Example: <FS>C1Please Enter Cash Back Amount

"C2" - Cash back prompt two

Field	Description	Length	Value
Token	Field ID	2	"C2"
Parameter	Cash back prompt two	varies	ASCII

Example: <FS>C2And Press Enter

"CF" - Cash back form name

Field	Description	Length	Value
Token	Field ID	2	"CF"
Parameter	Cash back form name	1 - 11	ASCII (upper case characters)

Example: <FS>CFCBKEYFRM

"CY" - Cash back yes/no prompting on or off

Field	Description	Length	Value
Token	Field ID	2	"CY"
Parameter	Cash back Yes/No prompting on or off	1	'Y' or 'N'

Example: <FS>CYN

"Y1" - Cash back yes/no prompt one

Field	Description	Length	Value
Token	Field ID	2	"Y1"
Parameter	Cash back Yes/No prompt one	varies	ASCII

Example: <FS>Y1Do You Want Cash Back?

"Y2" - Cash back yes/no prompt two

Field	Description	Length	Value
Token	Field ID	2	"Y2"
Parameter	Cash back Yes/No prompt two	varies	ASCII

Example: <FS>Y2Select Yes or No

"YF" - Cash back Yes/No form name

Field	Description	Length	Value
Token	Field ID	2	"YF"
Parameter	Cash back Yes/No form name	1 - 11	ASCII (upper case characters)

Example: <FS>YFCBYNFRM

"ET" - Encryption type

Field	Description	Length	Value
Token	Field ID	2	"ET"
Parameter	Encryption type	1	('N' - None, 'M' - MS, 'D' - DUKPT)

Example: <FS>ETD

"M" - Master key to use for master session PIN encryption

Field	Description	Length	Value
Token	Field ID	1	"M"
Parameter	Master key number to use for MS PIN encryption	1	'1' - '9'

Example: <FS>M3

"WK" - Working key for master session PIN encryption

Field	Description	Length	Value
Token	Field ID	2	"WK"
Parameter	Working key	16	ASCII Hex

Example: <FS>WK01D5FE020304ABEF

"P1" - PIN prompt one

Field	Description	Length	Value
Token	Field ID	2	"P1"
Parameter	PIN prompt one	varies	ASCII

Example: <FS>P1Please Enter Your PIN

"P2" - PIN prompt two

Field	Description	Length	Value
Token	Field ID	2	"P2"
Parameter	PIN prompt two	varies	ASCII

Example: <FS>P2And Press Enter

"PF" - PIN form name

Field	Description	Length	Value
Token	Field ID	2	"PF"
Parameter	PIN form name	1 - 11	ASCII (upper case characters)

Example: <FS>PFPINFRM

"BY" - Purchase/balance yes/no prompting on or off

Field	Description	Length	Value
Token	Field ID	2	"BY"
Parameter	Purchase/Balance Yes/No prompting	1	'Y' or 'N'

Example: <FS>BYY

"B1" - Purchase/balance yes/no prompt one

Field	Description	Length	Value
Token	Field ID	2	"B1"
Parameter	Purchase/Balance Yes/No prompt one	varies	ASCII

Example: <FS>B1Please Select

"B2" - Purchase/balance yes/no prompt two

Field	Description	Length	Value
Token	Field ID	2	"B2"
Parameter	Purchase/Balance Yes/No prompt two	varies	ASCII

Example: <FS>B2Purchase or Balance

"BF" - Purchase/balance yes/no form name

Field	Description	Length	Value
Token	Field ID	2	"BF"
Parameter	Purchase/Balance Yes/No form name	1 - 11	ASCII (upper case characters)

Example: <FS>BFPBYNFRM

"S1" - Swipe prompt one

Field	Description	Length	Value
Token	Field ID	2	"S1"
Parameter	Swipe prompt one	varies	ASCII

Example: <FS>S1Please Swipe Your

"S2" - Swipe prompt two

Field	Description	Length	Value
Token	Field ID	2	"S1"
Parameter	Swipe prompt two	varies	ASCII

Example: <FS>S2Credit Card

"SF" - Swipe form name

Field	Description	Length	Value
Token	Field ID	2	"SF"
Parameter	Swipe form name	1 - 11	ASCII (upper case characters)

Example: <FS>SFSWIPEFRM

"FS" - Frequent shopper yes/no

Field	Description	Length	Value
Token	Field ID	2	"FS"
Parameter	Purchase/Balance Yes/No prompting	1	'Y' or 'N'

Example: <FS>FSY

✓ **NOTE:** Turn on or off Frequent Shopper Card processing.

Configure Tender example:

Request:
<STX>E<FS>TTB<FS>RP<FS>CT2<FS>C1Please Enter Cash Back Amount<FS>C2And
Press Enter<FS>CFCBKEYFRM<FS>CYY<FS>Y1Do You Want Cash
Back?<FS>Y2Select Yes or No<FS>YFCBYNFRM<FS>ETD<FS>P1Please Enter Your
PIN<FS>P2And Press Enter<FS>PFPINFRM<FS>S1Please Swipe Your<FS>S2Debit
Card<FS>SFDEBITFRM<FS>FSN<ETX><LRC>
Response:
None.

Form Request 'V'

Display and process a form.
Form Request "V" is used for following purposes:

> To display any form assigning texts to global prompts, pole display, global buttons, and entry fields. It also allows displaying text lines over the form.
> To receive track data from magnetic or EFID card.
> To receive signature data (image).
> To enter PIN.
> To enter data from the terminal manually.
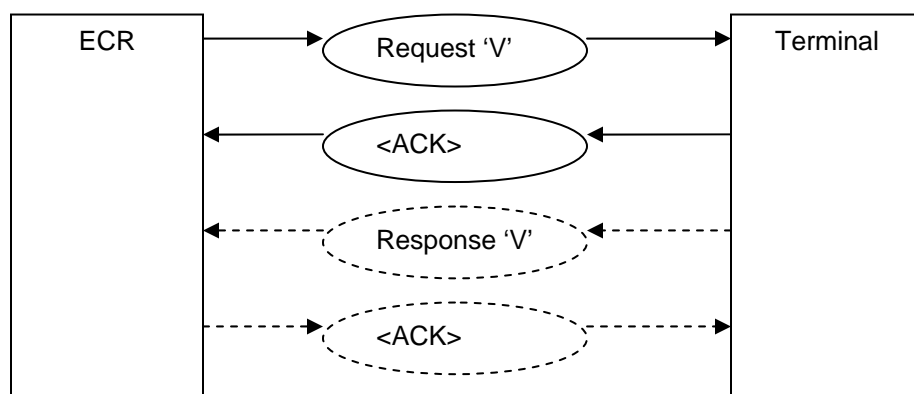
✔ **NOTE:** There may be none, or one, or more response messages on one request message.

✔ **NOTE:** Some of this request tokens are dependent on terminal type. See notes below.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'V'
Parameters	Field tokens	varies	ASCII

Response

Field	Description	Length	Value
Message Type	Message ID	1	'V'
Data	Field tokens	varies	ASCII

Field tokens used in Form Request - 'V' messages

✔ **NOTE:** Field tokens are in the format `<FS><Field Token><Data>`

Token	Description
AC	Account number to use for PIN encryption
B0 … B9	Global button text 0 … Global button text 9

Token	Description
C1 … C30	Pole display prompt 1 … Pole display prompt 30
DL	Display line of text
DT	Screen saver timeout
E0 … E9	Edit field text 0 … Edit field text 9
EF	Edit field format
ET	Encryption type (MS or DUKPT)
FN	Form Name
HP	HyperPass (Contactless Card Reader) (obsolete and not used any more)
M#	Master key number to use for MS PIN encryption
D#	DUKPT key number to use for DUKPT PIN encryption. Default DUKPT key number is 12.
P1 … P7	Global prompt 1 … Global prompt 7
SB	Signature capture buffer size
SM	Signature capture message
SP	Signature capture resolution
SS	Signature capture message enabled flag
ST	Signature capture time out value
SU	Signature capture uuencode flag
TF	Text format (Alignment)
TK	MSR tracks to read
TS	Track data source
WK	Working key to use for master session PIN encryption

Field tokens used in Form Requests descriptions

"AC" - Account number

Sets account number in the request for PIN entry. Required for PIN entry.

✓ *NOTE:* This token is processed on all types of terminals identically.

Field	Description	Length	Value
Token	Field ID	2	"AC"
Parameter	Account number to use for PIN encryption	12 - 19	ASCII numeric

Example: `<FS>AC4012000000001`

"B0" … "B9" – Global button text 0 … Global button text 9

Sets text to Global button caption. Optional.

✓ *NOTE:* These tokens are processed PD87xx/PD47xx terminals.

Field	Description	Length	Value
Token	Field ID	2	"B0" … "B9"
Text	Text to display	1 - 42	ASCII chars

✓ *NOTE:* The length of the text which can be displayed depends on used font.

Example: `<FS>B1Debit<FS>B2Credit`

"C1" … "C30" - Pole display prompt 1 … Pole display prompt 30
Sets text to Pole display prompt. Optional.

✓ *NOTE:* PDxxxx terminals process 1 to 30 pole display prompts. The length of the text which can be displayed depends on terminal type and font used.

Field	Description	Length	Value
Token	Field ID	2-3	"C1" … "C30"
Parameter	Scroll flag	1	'Y' or 'N'
Parameter	Text to display	varies	ASCII chars

Example: `<FS>C1NThis text goes on pole display line one`
Example: `<FS>C2NThis text goes on pole display line two`
Example: `<FS>C3NThis text goes on pole display line three`
Example: `<FS>C4NThis text goes on pole display line four`
Example: `<FS>C5NThis text goes on pole display line five`
Example: `<FS>C6NThis text goes on pole display line six`
Example: `<FS>C7YThis text goes on pole display line seven`

✓ *NOTE:* If the Scroll flag is 'Y', any text at this screen position will be scrolled up to the next screen position.

"DL" - Display Line
Allows displaying a specific format text line to the specific position of the screen. Optional.

✓ *NOTE:* This token is processed on all types of terminals. The length of the text which can be displayed depends on terminal type and font used.

Field	Description	Length	Value
Token	Field ID	2	"DL"
Parameter	Row	2	"00" - "15"
Parameter	Column	2	"00" - "42" Font dependant
Parameter	Display type	1	ASCII - Clear EOL 'C', Display Text 'D', Display Text Blinking 'B', Display Text Marquee 'M'
Parameter	Delay	3	ASCII numeric - ms for marquee or blinking "010" - "990" (10 ms increments)
Parameter	Foreground color	2	ASCII Hex "00" - "FF"
Parameter	Background color	2	ASCII Hex "00" - "FF"
Parameter	Font	1	ASCII numeric '0', '1', '2', '3', '4'
Text	Text to display	varies	

Example: `<FS>DL0112M10000FA2This text will marquee`

"DT" – Screen saver timeout
Sets Screen saver timeout in second. Optional.

✓ *NOTE:* This token is processed on PDxxxx terminals.

Field	Description	Length	Value
Token	Field ID	2	"DT"
Data	Timeout in seconds	1-9	ASCII numeric

Example: `<FS>DT100`

"E0" … "E9" – Edit field text 0 … Edit field 9
Sets text into edit fields. Optional.

Field	Description	Length	Value
Token	Field ID	2	"E0" … "E9"
Text	Text to display	varies	ASCII chars

Example: `<FS>E1Edit field 1`

"EF" – Edit field format
Sets specific data entry formats (date, phone number, and SSN) for numeric entry fields.
Optional.

Field	Description	Length	Value
Token	Field ID	2	"EF"
Data	Edit field number	1	ASCII numeric 0 – 9 Edit field number.
Data	Edit field format	1	ASCII numeric 0 – 3 "0" – no format "1" – social security number "2" – date "3" – phone number

Example: `<FS>EF12<FS>EF22`

"ET" - Encryption type
Sets Encryption type in the request for PIN entry. Required for PIN entry.

✓ *NOTE:* This token is processed on all types of terminals identically.

Field	Description	Length	Value
Token	Field ID	2	"ET"
Parameter	Encryption type	1	'M' – for Master Session, 'D' – for DUKPT, 'W' – encryption without account number.

Example: `<FS>ETM`

"FN" - Form name
Sets a name of the screen to display. Required.

✓ *NOTE:* This token is processed on all types of terminals identically.

Field	Description	Length	Value
Token	Field ID	2	"FN"
Parameter	Form name to process	1 - 11	ASCII form name

Example: `<FS>FNEDITSCREEN`

"HP" – HyperPass (Contactless Card Reader) enable
Enables HyperPass (Contactless Card Reader) on ICE 5K terminals and may not apply to
Symbol payment terminals.

Field	Description	Length	Value
Token	Field ID	2	"HP"

✓ **NOTE:** There is no parameter for this token.

Example: `<FS>HP`

"M#" - Master key index
Sets Master key index. This token is required for PIN entry in case of Master Session encryption type.

✓ **NOTE:** This token is processed on all types of terminals identically.

Field	Description	Length	Value
Token	Field ID	2	"M#"
Parameter	Master key number to use for MS encryption	1	ASCII numeric (1 - 9)

Example: `<FS>M#3`

"D#" - DUKPT key index
Sets DUKPT key index. This token is required for PIN entry in case of DUKPT encryption type.

Field	Description	Length	Value
Token	Field ID	2	"D#"
Parameter	DUKPT key number to use for DUKPT encryption	1-2	ASCII numeric (1 - 12)

Example: `<FS>D#9`

"P1" … "P9" - Global prompt 1 … 9
Sets text to Global prompt line. Optional.

✓ **NOTE:** PDxxxx terminals process global prompts 1 to 9. The length of the text which can be displayed depends on terminal type and font used.

Field	Description	Length	Value
Token	Field ID	2	"P1" … "P9"
Text	Text to display	varies	ASCII chars

Example: `<FS>P1Display this as global prompt one`
Example: `<FS>P2Display this as global prompt two`

Example for PDxxxx terminals：
```
<FS>P1Display this as global prompt one<FS>P2Display this as global
prompt two<FS>P5Display this as global prompt five<FS>P6Display this as
global prompt six<FS>P7Display this as global prompt seven
```

"SB" - Signature capture buffer size

Is used to change (usually increase) default Signature capture buffer size. If request message contains "SB" token, response message will contain "SB" token instead "SD". Optional.

✓ *NOTE:* This token is processed on PD8700 and PD4750 terminals only.

Field	Description	Length	Value
Token	Field ID	2	"SB"
Parameter	Buffer size specified in bytes	1-5	ASCII numeric

Example: `<FS>SB11111`

"SM" Signature capture message

Is used to change signature capture default warning message text. Optional.

✓ *NOTE:* This token is processed on all types of terminals identically.

Field	Description	Length	Value
Token	Field ID	2	"SM"
Parameter	Message text	varies	ASCII chars

✓ *NOTE:* The length of the text which can be displayed depends on terminal type.

Example: `<FS>SMPlease sign inside signature box`

"SP" – Signature capture resolution

Sets signature capture resolution. Optional.

✓ *NOTE:* This token is processed on all types of terminals identically.

Field	Description	Length	Value
Token	Field ID	2	"SP"
Parameter	X axis resolution	4	ASCII numeric Max 1024 zero filled left
Parameter	Y axis resolution	4	ASCII numeric Max 1024 zero filled left
Parameter	X axis extended line limit	1	ASCII numeric 0 – 9
Parameter	Y axis extended line limit	1	ASCII numeric 0 – 9

Example: `<FS>SP1024064011`

"SS" Signature capture message enabled flag

Sets Signature capture message enabled flag "On" or "Off". Optional. By default message enabled flag is "On".

✓ *NOTE:* This token is processed on all types of terminals identically.

Field	Description	Length	Value
Token	Field ID	2	"SS"
Parameter	Message enabled Yes/No	1	'Y' or 'N'

Example: `<FS>SSN`

"ST" – Signature capture time out

Sets "Pen up time-out" what means the time interval in seconds between the moment when the pen is up and the response message sending. If signature buffer is completely filled by signature data, Pen up time-out is ignored, and response message is sending immediately. Pen up time-out = 0 means that terminal responds on Enter button is pressing.

✓ **NOTE:** This token is processed on all types of terminals identically.

Field	Description	Length	Value
Token	Field ID	2	"ST"
Parameter	Pen up time out value in seconds	1	ASCII numeric '0' – '9' '0' = no time out

Example: `<FS>ST3`

"SU" – Signature capture uuencode flag

Sets Signature capture uuencode flag "On" or "Off". If flag is "On", signature data containing in "SD" or "SB" token of response message should be uuencoded. Default value of Signature capture uuencode flag is "Off".

✓ **NOTE:** This token is processed on all types of terminals identically.

Field	Description	Length	Value
Token	Field ID	2	"SU"
Parameter	Signature Uuencode Yes/No	1	'Y' or 'N'

Example: `<FS>SUY`

✓ **NOTE:** Uuencode is an algorithm which allows transmitting binary data over transmission mediums that do not support other than simple ASCII data.

Uuencode repeatedly takes in a group of three bytes, adding trailing zeros if there are less than three bytes left. These 24 bits are split into four groups of six which are treated as numbers between 0 and 63. Decimal 32 is added to each number and they are output as ASCII characters which will lie in the range 32 (space) to 32+63 = 95 (underscore).

As the result each three input binary data are converted into four ASCII characters. Uuencode flag defaults to No.

"TF" – Text format (Alignment)

Aligns text in pole display lines, global prompts, and edit fields. Optional. Default alignment for pole display and global prompts – Left; for edit fields – Right.

✓ *NOTE:* This token is processed on all types of terminals identically.

Field	Description	Length	Value
Token	Field ID	2	"TF"
Parameter	Control type	1	'C' – pole display line, 'P' – global prompt, 'E' – edit field.
Parameter	Control number	1 - 2	ASCII numeric: 1 – 30 for pole display line, 1 – 9 for global prompt, 0 – 9 for edit field.
Parameter	Direction	2	"HJ" – for horizontal justification
Parameter	Alignment type	1	'L' – Left, 'C' – Center, 'R' - Right

Example: `<FS>TFP1HJC`

"TK" – MSR track to read

Determines which track data to send in the response message. Required in request for MSR or RFID card data.

✓ *NOTE:* This token is processed on all types of terminals identically.

Field	Description	Length	Value
Token	Field ID	2	"TK"
Parameter	Tracks to read	1	ASCII numeric '1' '2' '3' '4' (4 = All tracks)
Parameter	JCB Tracks to read	1	Optional. ASCII numeric '4' If present, requests reading JIS-II data

Example: `<FS>TK1`
Example: `<FS>TK2`
Example: `<FS>TK3`
Example: `<FS>TK4`
Example: `<FS>TK44`

"TS" – Track data source

If request has "TS" token, response message will have "TS" token containing track data source information.

✓ *NOTE:* This token is processed on PDxxxx terminals.

Field	Description	Length	Value
Token	Field ID	2	"TS"

Example: `<FS>TS`

"WK" – Working key for master session PIN encryption

Sets Working key. This token is required for PIN entry in case of Master Session encryption type.

✓ *NOTE:* This token is processed on all types of terminals identically.

Field	Description	Length	Value
Token	Field ID	2	"WK"
Parameter	Working key	16	ASCII Hex

Example: `<FS>WK01D5FE020304ABEF`

Field tokens sent by FPE in response to Form Request 'V' messages

✓ *NOTE:* Field tokens are in the format <FS><Field Token><Data>

Token	Description
BF	Button selection
C	Check box 'checked' state
F	Edit field data
KS	DUKPT key serial number
PD	PIN block
R	Radio button selection
SB	Signature data (specified size)
SD	Signature data
T	Track data
TS	Track data source
XM	MSR error
XP	PIN error
FN	Form Name
IC	Integrated Circuit Card (ICC) insertion and/or removal

Field tokens sent by FPE in response to Form Requests descriptions -

"BF" - Button selected

Contains return code of pressed key or button. May be only one in the response message.

Field	Description	Length	Value
Token	Field ID	2	"BF"
Parameter	Button return key	1	ASCII (binary 1 for "Enter" button)

Example: `<FS>BFB`

'C' - Check box 'checked' state

Contains information about check box state. One per each check box on the screen.

Field	Description	Length	Value
Token	Field ID	1	'C'
Parameter	Check box number	1	ASCII numeric (0 - 9)
Data	Check box state	1	ASCII numeric 1 = checked 0 = not checked

Example: `<FS>C01`
Example: `<FS>C11`
Example: `<FS>C20`

✔ *NOTE:* Check box numbers correlate to the order of the check box fields on the form.

'F' - Edit field data

Contains edit field data. One per each non-empty edit field on the screen.

Field	Description	Length	Value
Token	Field ID	1	'F'
Parameter	Field number	1	ASCII numeric (0 - 9)
Data	Field data	1 - 99	ASCII and ASCII numeric

Example: `<FS>F123.99`
Example: `<FS>F2123456`
Example: `<FS>F3Mary Smith`

✔ *NOTE1:* Field numbers correlate to the order of the fields on the form. Data entered in the first edit field on the form will be returned in F1, data entered in the second edit field will be return in F2 etc. The type of data returned is determined by the field type - numeric, alpha, amount, etc.

✔ *NOTE2:* Master session and DUKPT edit field data is returned in "PD" and "KS" fields.

"KS" - DUKPT key serial number

Response on PIN entry.

Field	Description	Length	Value
Token	Field ID	2	"KS"
Data	Key serial number	20	ASCII numeric

Example: `<FS>KS10000004598000000035`

"PD" - PIN block data

Response on PIN entry.

Field	Description	Length	Value
Token	Field ID	2	"PD"
Data	PIN block	16	ASCII hex

Example: `<FS>PD1BCF5FDE1B8FAC9A`

'R' - Radio button selection

Contains information about Radio button selection. One per each radio button group on the screen.

Field	Description	Length	Value
Token	Field ID	1	'R'
Parameter	Group number	1	ASCII numeric (0 - 9)
Parameter	Group index	1	ASCII numeric (0 - 9)

Example: `<FS>R11`

✓ *NOTE:* The radio button returned is the one in its group that was selected when the form completed.

"SB" - Signature data (specified size)

Entered signature image if buffer size was specified by "SB" token of "V" request.

Field	Description	Length	Value
Token	Field ID	2	"SB"
Data	Size of the entered signature (in bytes)	1-5	ASCII numeric
Data	Signature data	1 – 99999	Binary data - can contain NULLs and other control characters

Example: `<FS>SB00011<11 bytes of signature data>`

"SD" - Signature data

Entered signature image if buffer size was not specified by "SB" token of "V" request.

Field	Description	Length	Value
Token	Field ID	2	"SD"
Data	Data length	3	ASCII numeric
Data	Signature data	1 - 500	Binary data - can contain NULLs and other control characters

Example: `<FS>SD087<87 bytes of signature data>`

'T' - MSR track data
Data received from one track of MSR or RFID card

Field	Description	Length	Value
Token	Field ID	1	'T'
Parameter	Track ID	1	ASCII numeric '1' '2' '3'
Data	Track data	varies	ASCII and ASCII numeric

Example: `<FS>T1B4012000000001^HYPERCOM/TEST CARD^050201234567890`
Example: `<FS>T24012000000001=050201234567890`
Example: `<FS>T3HYPERCOM TEST CARD 1234567890`

"TS" Track data source
Track data source, if requested by "TS" token of "V" request.

Field	Description	Length	Value
Token	Field ID	2	"TS"
Data	Track data source	1	'0' - TRACK_READER '1' - RDIF_EXPRESS_PAY '2' - RFID_PAY_PASS '3' - RFID_VISA_WAVE '4' - RFID_UNKNOWN_APP

Example: `<FS>TS1`

"XP", "XM" - See Error response 'X' description.

"FN" - Form name
Source Form Name sent by PDxxxx application v 3.0.010, if "FN" tag sending in Form Request 'V' response is configured in FormBuilder 4.9.5.

Field	Description	Length	Value
Token	Field ID	2	"FN"
Parameter	Form name to process	1 - 11	ASCII form name

Example: `<FS>FNEDITSCREEN`

"IC" – ICC Card (or Smart Card) insertion and/or removal
This field will be sent by PDxxxx application v3.0.020, if "Enable Smart Card Reader" option is enabled for the MSR control located on the form in FormBuilder 4.9.6.

Field	Description	Length	Value
Token	Field ID	2	"IC"
Data	ICC card (or Smart Card) insertion/removal Flag	1	"Y" - ICC Card inserted, "N" - ICC Card removed
Data	ATR	0-64	ASCII hex

Example: `<FS>ICY`

Form message examples -

Request:
`<STX>V<FS>FNSIGSCREEN<FS>ST3<FS>SP1024064011<ETX><LRC>`
FPE responds with any data entered on the form, in this case signature data.
Response:
`<STX>V<SD025<25 bytes of signature data><ETX><LRC>`

Request:
`<STX>V<FS>FNEDITSCREEN<FS>ETM<FS>M3<FS>AC4012000000001<ETX><LRC>`
FPE responds with any data entered on the form, in this case master session PIN data.
Response:
`<STX>V<FS>PD1BCF5FDE1B8FAC9A<ETX><LRC>`

Request:
`<STX>F<FS>FNBUTTONSCR<FS>P2Display this as prompt two <ETX><LRC>`
FPE responds with the button return key of the button that was selected to end processing of the form. In this case the button pressed has a return key of FuncKey2 'B'.
Response:
`<STX>V<FS>BFB<ETX><LRC>`

Displaying the Form

"FN" token sets a name of the screen to display. It is the only required token in Form Request message.

"Pn" tokens, where 1 <= n <= 9 set text to Global prompt fields. Form may contain up to 9 Global prompt fields or not to have them at all. Global prompt fields' formats and positions are set on the form development stage and cannot be changed by FPE application.

"Cn" tokens, where 1 <= n <= 30 set text to Pole display prompt fields. Form may contain up to 30 Pole display prompt fields or not to have them at all. Pole display prompt fields' formats and positions are set on the form development stage and cannot be changed by FPE application. If Form request 'V' contains only "Cn" tokens, it may not have "FN" token. In this case Pole display prompt text lines will be put on currently displayed form.

"Bn" tokens, where 0 <= n <= 9 set text to Global button captions. Form may contain up to 10 Global buttons or not to have them at all. Global buttons' sizes, colors, and positions are set on the form development stage and cannot be changed by FPE application.

"DL" token allows displaying a specific format text line to the specific position of the screen. This position and format does not depend on displayed form outlook.

"En" tokens, where 0 <= n <= 9 set text into edit fields. Form may contain up to 10 edit fields or not to have them at all. Edit fields sizes, positions, and some other parameters are set on the form development stage and cannot be changed by FPE application. "En" token just put specified text into corresponding edit field without any check, so you may put alpha data into numeric field.

"EF" token allows setting specific data entry formats (date, phone number, and SSN) for numeric entry fields.

Getting Track Data

To receive track data from magnetic or EFID card Form Request "V" must contain "FN" and "TK" tokens.
To receive information about track data source "TS" token has to be added.
Request message may have any other tokens allowed for "V" request but they will not affect on the content of the response message.
Only one "V" response containing track data may be received per one Form Request "V".

Examples:
1. Request:
`<STX>V<FS> FNSWIPEFRM<FS>TK4<FS>TS<ETX><LRC>`
FPE responds with track data source and track data of swiped card.
Response:
`<STX>V<FS>TS0<FS>TK1<track 1 data><FS>TK2<track 2 data><ETX><LRC>`

2. Request:
`<STX>V<FS> FNSWIPEFRM<FS>TK2<ETX><LRC>`
FPE responds with data of requested track from swiped card.
Response:
`<STX>V<FS>TK2<track 2 data><ETX><LRC>`

Getting Signature Data

Form Request "V" to receive signature image must contain "FN" token. It is the only required token. Screen for the signature entry must have special Signature capture entry field.

"FN" token sets a name of the screen for the signature entry. This screen must have special Signature capture entry field. It is the only required token.

"ST" token sets "Pen up time-out" what means the time interval in seconds between the moment when the pen is up and the response message sending. If signature buffer is completely filled by signature data, Pen up time-out is ignored, and response message is sending immediately. Pen up time-out = 0 means that terminal responds on Enter button is pressing.

"SS" token sets Signature capture message enabled flag "On" or "Off". If flag is "On", terminal displays warning message box always when you touch screen outside signature capture area. If

flag is "Off" terminal ignores touches outside signature capture area. Signature capture message enabled flag default value is "On".

"SM" token used to change signature capture default warning message text "Please sign in signature box". New text will stay actual until next Form request "V" with "SM" token, or terminal reboot.

"SP" token sets signature capture resolution. If "SP" token is omitted, response message contains signature data in legacy format (resolution = 640 x 128; data buffer size 500 bytes). If "SP" token is present, response message contains signature data in enhanced format (resolution <= 1024 x 1024; data buffer size 900 bytes).

"SB" token sets a size of signature capture buffer. It is used to increase or to decrease default signature data buffer size. In case of "SB" token in the Form request "V" message, response message "V" should contain signature data in "SB" token instead of "SD".

"SU" token sets Signature capture uuencode flag "On" or "Off". If flag is "On", signature data containing in "SD" or "SB" token of response message should be uuencoded (Uuencoded data contains only ASCII characters). Default value of Signature capture uuencode flag is "Off".

Request message may have any other tokens allowed for "V" request but they will not affect on the content of the response message.
Only one "V" response containing signature data may be received per one Form Request "V".

PIN Entry

Form Request "V" allows entering a PIN using DUKPT or Master Session encoding.

"FN" token sets a name of the screen for the PIN entry. This screen must have special PIN entry field. "FN" token is required for PIN entry.

"AC" required token which determines Account number.

"ET" required token which sets one of two available encryption types - Master Session (M) or DUKPT (D).

"M#" token which sets Master key index. This token is required only for Master Session encryption type.

"WK" token which sets Working key for master session PIN encryption. This token is required only for Master Session encryption type.

Manual Data Entry

Form Request "V" allows entering data manually using screen controls (edit fields, buttons, radio buttons, and check boxes).

To enter any data you have to display screen containing required controls, enter required data and press "Enter" button.

Response message will contain "BF" token with Button return key and as many "Fn", "Cn", "Rn" tokens, as non-empty entry fields, check boxes, and radio button groups are on the screen.

Global Parameters 'G'

Download global parameters to the terminal.
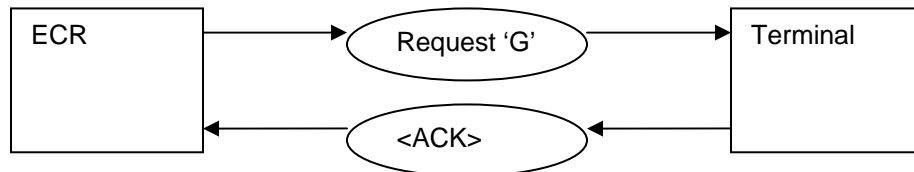
```
┌─────────┐              ╭───────────────╮              ┌─────────┐
│  ECR    │ ───────────▶ │  Request 'G'  │ ──────────▶ │Terminal │
│         │              ╰───────────────╯              │         │
│         │ ◀─────────── ╭───────────────╮ ◀────────── │         │
└─────────┘              │    <ACK>      │              └─────────┘
                         ╰───────────────╯
```

✔ *NOTE:* This request is processed on all types of terminals.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'G'
Parameters	Field tokens	Varies	ASCII

Response
None

Field tokens used in Global Parameters 'G' messages

✔ *NOTE:* Field tokens are in the format <FS><Field Token><Data>

Token	Description
FA	Idle state first action - swipe, tender or either
KD	Key Down POS Event
PS	Communications packet size
SP	Screen protector
SW	MSR POS Event

Field tokens used in Global Parameters descriptions -

"PS" - Communications packet size

Field	Description	Length	Value
Token	Field ID	2	"PS"
Parameter	Packet size	3	ASCII Numeric - zero filled left 009 - 975

"FA" - Idle state first action

Field	Description	Length	Value
Token	Field ID	2	"FA"
Parameter	First action	1	'S'wipe, 'T'ender or 'E'ither

"KD" – Key Down POS Event

Field	Description	Length	Value
Token	Field ID	2	"KD"

Parameter	Event on/off	1	'Y'es, 'N'o

"SW" – MSR POS Event

Field	Description	Length	Value
Token	Field ID	2	"SW"
Parameter	Event on/off	1	'Y'es, 'N'o

"SP" – Screen Protector

Field	Description	Length	Value
Token	Field ID	2	"SP"
Parameter	Notify ECR on/off	1	'Y' - Yes, 'N' - No
Parameter	ECR Notification interval	2	Number of days (ASCII Numeric)
Parameter	Text to display	Varies	Reminder message (ASCII)

✓   **NOTE:** "SP" token is processed on PD8700 and PD4750 terminals only.

Global Parameters examples -

Request:
```
<STX>G<FS>PS325<FS>FAS<ETX><LRC>
```
Request:
```
<STX>G <FS>KDY<FS>SWY<ETX><LRC>
```
FPE does not respond other than the protocol ACK.
Response:
None

Split Message 'H'

Sent by FPE when the response to a command would exceed the packet size configured with the Global Parameters 'G' message. This message is the same from all types of terminals.
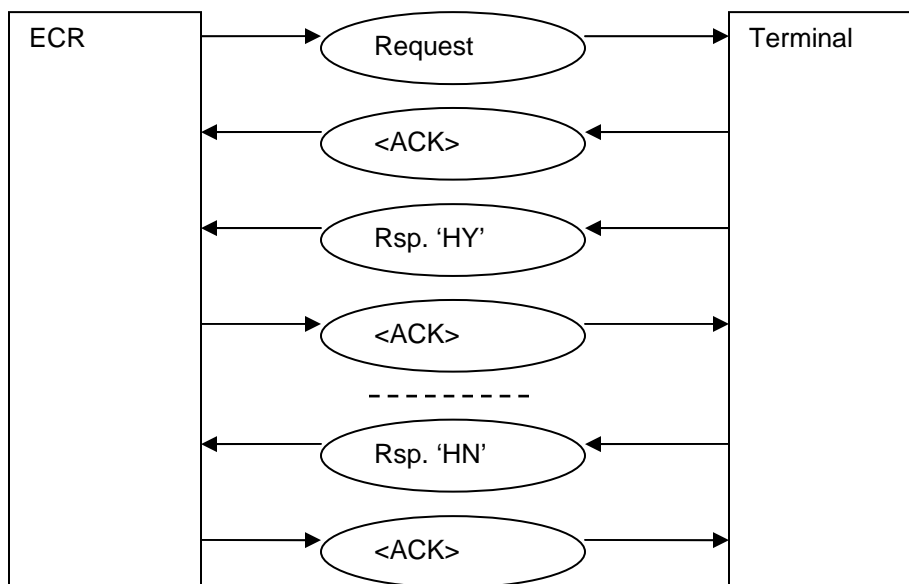
Response

Field	Description	Length	Value
Message Type	Message ID	1	'H'
Data	More Data Flag	1	'Y' or 'N'
Data	Data length	3	"001" – "965" ASCII numeric
Data	Data	1 – 965	Binary (values 0 – 255)

Split Message example -

Request:
```
<STX>V<FS>FNSIGSCREEN<FS>ST3<FS>SP1024064011<ETX><LRC>
```

The response to this Form Request contains signature capture data making the message length longer than the communications packet size (200) configured with the Global Parameters message. FPE splits the Form Request response into as many Split Messages as required to transmit the entire response. The ECR is responsible for re-assembling the response parts. The re-assembled message will look exactly like the response if it had not been split except the <STX>, <ETX> and <LRC> will be striped.

Response:
```
<STX>HY200<200 bytes of the 325 byte response><ETX><LRC>
<STX>HN125<the remaining 125 bytes of the response><ETX><LRC>
```

Initiate Code Download 'I'

Put the terminal into the code download mode.
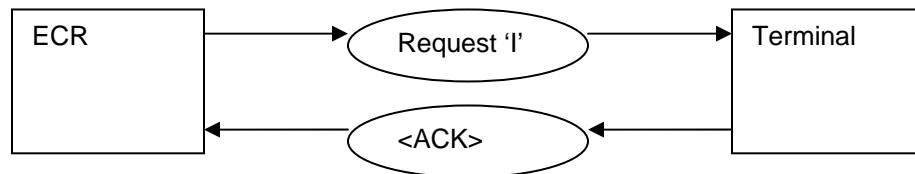
✓ **NOTE:** This request is processed on all types of terminals identically.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'I'
Parameter	Baud rate	4 - 6	ASCII numeric "9600", "19200", "57600", "115200", "153600"

Response

None

Initiate Code Download example -

Request:
```
 <STX>I19200<ETX><LRC>
```

FPE does not respond other than the protocol ACK.

Response:
None

Poll Customer Data 'J'

Poll the terminal for any data collected in customer activated mode.
If any tokens are included in the request message, FPE will send back only the requested token data, otherwise, all available data is sent.
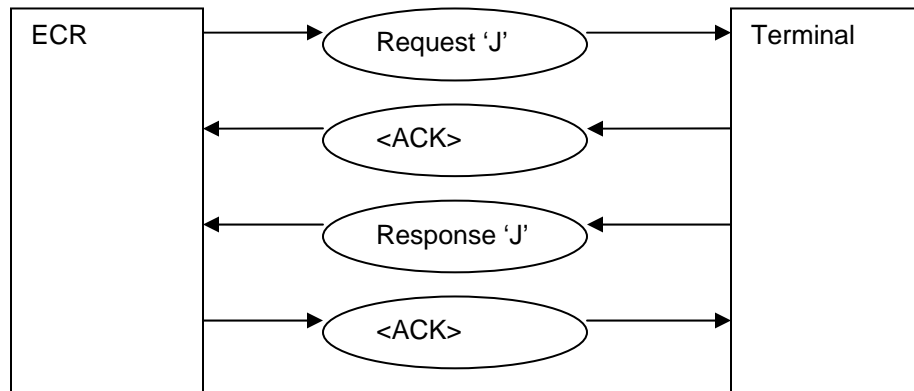
✔ **NOTE:** This token is processed on all types of terminals identically.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'J'
Parameter	None		

Field tokens used in Poll Customer Data 'J' messages

✔ **NOTE:** Field tokens are in the format <FS><Field Token>

Token	Description
CB	Cash back amount
F	Frequent shopper track data
FS	Current FPE customer activated state
KS	DUKPT key serial number
PD	PIN block
T	Track data
TS	Track data source
TT	Tender type

Poll customer data example -

Request:
<STX>J<ETX><LRC>   (Send all data)
<STX>J<FS>T<FS>PD<FS>TT<FS>CB<ETX><LRC>   (send only data requested)

Response

Field	Description	Length	Value
Message Type	Message ID	1	'J'

Data	Field tokens	varies	ASCII

Field tokens sent by FPE in response to Poll Customer Data 'J' messages

✓ *NOTE:* Field tokens are in the format <FS><Field Token><Data>

Token	Description
CB	Cash back amount
F	Frequent shopper track data
FS	Current FPE customer activated state
KS	DUKPT key serial number
PD	PIN block
T	Track data
TS	Track data source
TT	Tender type
XM	MSR error
XP	PIN error
XT	Frequent shopper MSR error

Field tokens in response to Poll Customer Data 'J' messages descriptions

'T' - MSR track data

Field	Description	Length	Value
Token	Field ID	1	'T'
Parameter	Track ID	1	ASCII numeric '1' '2' '3' '4'
Data	Track data	varies	ASCII and ASCII numeric

Example: <FS>T1B4012000000001^HYPERCOM/TEST CARD^050201234567890
Example: <FS>T24012000000001=050201234567890
Example: <FS>T3HYPERCOM TEST CARD 1234567890

"PD" - PIN block data

Field	Description	Length	Value
Token	Field ID	2	"PD"
Data	PIN block	16	ASCII hex

Example: <FS>PD1BCF5FDE1B8FAC9A

"KS" - DUKPT key serial number

Field	Description	Length	Value
Token	Field ID	2	"KS"
Data	Key serial number	20	ASCII numeric

Example: <FS>KS10000004598000000035

"TT" - Tender type

Field	Description	Length	Value
Token	Field ID	2	"TT"
Data	Tender type	1	ASCII see key codes table
Data	Purchase/Balance flag	1	ASCII - 'P'urchase or 'B'alance

Example: <FS>TTA

"FS" - Current customer activated state

Field	Description	Length	Value
Token	Field ID	2	"FS"
Data	State	1	See customer activated states table

Example: `<FS>FSA`

"CB" - Cash back amount

Field	Description	Length	Value
Token	Field ID	2	"CB"
Data	Cash back amount	0 - 50	ASCII

Example: `<FS>CB12345`   // Entered on the keyboard. Implied decimal (123.45)
Example: `<FS>CB$ 5.00`   // Selected from a button
Example: `<FS>CB`   // No cash back amount entered

✓ *NOTE:* If the cash back amount was entered from the keyboard the cash back amount will be in the form nnnnn. The decimal point is implied. If the cash back amount was selected from a button the data will be the button's text.

'F' - Frequent shopper track data

Field	Description	Length	Value
Token	Field ID	1	'F'
Parameter	Track ID	1	ASCII numeric '1' '2' '3'
Data	Track data	Track 1 - 79 Track 2 - 40 Track 3 - 100	ASCII and ASCII numeric

Example: `<FS>F1B4012000000001^HYPERCOM/TEST CARD^050201234567890`
Example: `<FS>F24012000000001=050201234567890`
Example: `<FS>F3HYPERCOM TEST CARD 1234567890`

"TS" Track data source

Field	Description	Length	Value
Token	Field ID	2	"TS"
Data	Track data source	1	'0' - TRACK_READER '1' - RDIF_EXPRESS_PAY '2' - RFID_PAY_PASS '3' - RFID_VISA_WAVE '4' - RFID_UNKNOWN_APP

Example: `<FS>TS1`

"XP", "XM", "XT" - See Error response 'X' description.

Poll customer data example -

Request:

```
<STX>J<ETX><LRC>
```

FPE responds with any data entered by the customer.

Response:

```
<STX>J<FS>TTAP<FS>FSA<FS>T1B4012000000001^HYPERCOM/TEST
CARD^050201234567890
<FS>T24012000000001=050201234567890<FS>CB$
5.00<FS>F224000000000000001=050201234567890<FS>TS1<ETX><LRC>
```

Disable/Enable Keyboard Toggle 'K'

Toggle the keyboard on and off.
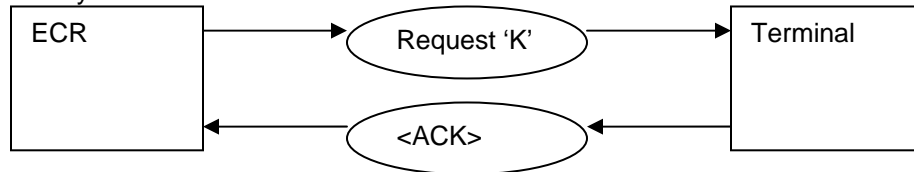
```
┌─────────┐          ╭─────────────╮          ┌─────────┐
│   ECR   │ ───────▶ │ Request 'K' │ ───────▶ │ Terminal│
│         │          ╰─────────────╯          │         │
│         │ ◀─────── ╭─────────────╮ ◀─────── │         │
└─────────┘          │    <ACK>    │          └─────────┘
                     ╰─────────────╯
```

✓   **NOTE:** This token is processed on ICE terminals and may not apply to Symbol payment terminals.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'K'

Response

None

Disable/Enable Keyboard toggle example -

Request:
 `<STX>K<ETX><LRC>`
FPE does not respond other than the protocol ACK.
Response:
None

File Delete 'L'

Delete a file from the terminal's file system.
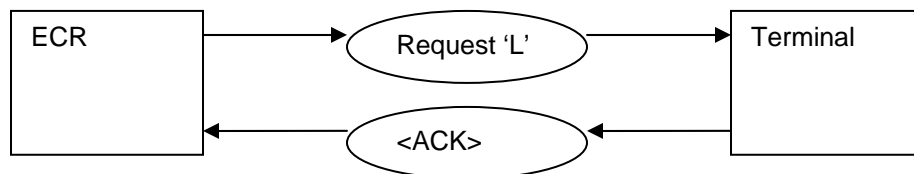
```
┌─────────┐          ╭─────────────╮          ┌─────────┐
│   ECR   │ ───────▶ │ Request 'L' │ ───────▶ │ Terminal│
│         │          ╰─────────────╯          │         │
│         │ ◀─────── ╭─────────────╮ ◀─────── │         │
└─────────┘          │    <ACK>    │          └─────────┘
                     ╰─────────────╯
```

✓   **NOTE:** This request is processed on all types of terminals identically.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'L'
Parameter	File name to delete	1 - 256	ASCII

Response

None

File Delete example -

Request:

```
<STX>LCONFIG.SYS<ETX><LRC>
```

FPE does not respond other than the protocol ACK.

Response:

None

Update Display 'M'

Update Display 'M' message should be used for the following purposes:
- o Update current or put new prompts on the current form.
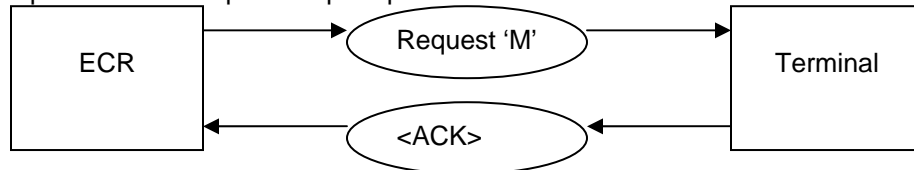
Figure 1 Update prompts

✓ *NOTE:* This request with tokens "C1" …"C30", "DL", and "TF" is processed on all types of terminals.

- o Manipulate (insert, update, and remove) the items of a control, which is uniquely identified by control type ID and control ID.
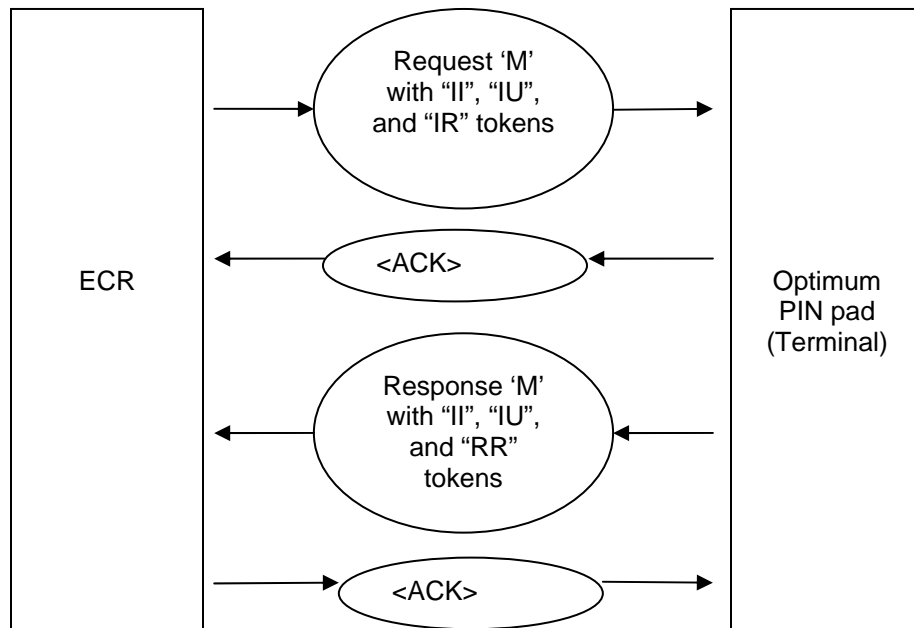
Figure 2 Manipulate the items of a control

✓ *NOTE:* This request with tokens "II", "IU", and "IR" is processed only on Optimum PIN pads.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'M'
Parameters	Field tokens	Varies	ASCII

Response to 'M' request with "C1" …"C30", "DL", "TF" tokens

None

✔ *NOTE:* Supported on all types of terminals (Optimum PIN pads).

Response to 'M' request having "II", "IU", and "IR" tokens

✔ *NOTE:* Supported on Optimum PIN pads only.

Field	Description	Length	Value
Message Type	Message ID	1	'M'
Data	Field tokens	varies	ASCII

Field tokens used in Update Display 'M' messages

✔ *NOTE:* Field tokens are in the format `<FS><Field Token><Data>`

Token	Description
C1 … C30	Customer prompt 1 … Customer prompt 30 **Note:** PDxxxx terminals utilize "C1" - "C30"
DL	Display line of text
TF	Text format (Alignment)
II	Insert an item into a control (FPE 3.0.010 supports only scrolling receipts list control type)
IR	Remove an item from a control (FPE 3.0.010 supports only scrolling receipts list control type)
IU	Update an item in a control (FPE 3.0.010 supports only scrolling receipts list control type)

Field tokens used in Update Display descriptions

See "C1"-"C30", "DL" and "TF" field token descriptions in Form Request 'V' section.

✔ *NOTE:* All Customer prompt tokens can be sent with an Update Display message.

"II" – Insert an item into a control

Allows insertion of an item into a control before or after the specified item ID. The control is uniquely identified by control type and ID. These values are specified in corresponding parameters (see below).

✔ *NOTE:* FPE32 3.0.010.supports only one type of the controls - list of scrolling receipts (Control Type ID is '01').

If Location ID parameter is 'I' application will ignore value specified in the Item ID parameter and will insert an item to the top or bottom of the list based on scrolling receipts list control configuration in FormBuilder. We are assuming the length of the text which can be displayed depends on terminal type and font used.

✓ **NOTE:** This token is processed only on Optimum PIN pads. Refer to Manipulating the scrolling receipts list control items section for more information.

Field	Description	Length	Value
Token	Field ID	2	"II"
Parameter	Control Type ID	2	ASCII numeric: '01'- Scrolling receipts list control
Parameter	Control ID	3	ASCII numeric
Parameter	Item ID	3	ASCII numeric '001', '002', etc
Parameter	Location ID	1	ASCII chars: 'I'- Ignore, 'B'- before, 'A'- after
Text	Text to display	varies	

Example: insert item with text 'Item2 text' after item with ID '001' to the control with type '01' and ID '001'
```
<FS>II01001001AItem2 text
```

"IR" – Remove an item from a control

Allows removal of an item from a control. The control is uniquely identified by control type and ID. These values are specified in corresponding parameters (see below).

If Flag parameter is '*' application will ignore value specified in the Item ID parameter and will remove all items of the specified control (uniquely identified by Control Type ID and Control ID).

✓ **NOTE:** FPE32 3.0.010 supports only one type of the controls - list of scrolling receipts (Control Type ID is '01'). This token is processed only on Optimum PIN pads. Refer to Manipulating the scrolling receipts list control items section for more information.

Field	Description	Length	Value
Token	Field ID	2	"IR"
Parameter	Control Type ID	2	ASCII numeric: '01'- Scrolling receipts list control
Parameter	Control ID	3	ASCII numeric
Parameter	Item ID	3	ASCII numeric '001', '002', etc
Parameter	Flag	0 - 1	ASCII char: '*' – delete all the items from a control.

✓ **NOTE:** FPE does not pose any limitations on the number of "IR" tokens allowed per Update Display message.

Example:
  o To remove items with '001' and '002' Ids from the control with type '01' and ID '002'
```
<FS>IR01002001<FS>IR01002002
```

  o To remove all items from the control with type '01' and ID '002'. Please note, value specified in Item ID will be ignored by FPE.
```
<FS>IR01002000*
```

"IU" – Update an item in a control

Used to update an item in a control. The control is uniquely identified by control type and ID. These values are specified in corresponding parameters (see below).

✓   **NOTE:** This token is processed only on Optimum PIN pads starting from version 3.0.010.
    See Manipulating the scrolling receipts list control items section for more information.

Field	Description	Length	Value
Token	Field ID	2	"IU"
Parameter	Control Type ID	2	ASCII numeric: '01'- Scrolling receipts list control
Parameter	Control ID	3	ASCII numeric
Parameter	Item ID	3	ASCII numeric '001', '002', etc
Parameter	Style ID	1	ASCII numeric: '0' – not crossed, '1' – crossed*
Text	Text to display	varies	

* like ~~Bottle of Ketchup $2.99~~

Comments:
If the length of the text field is 0, text of the item will remain as it was before the update operation.
This may be very helpful when only change of style (crossed/not crossed) is required.

✓   **NOTE:** FPE does not pose any limitations on the number of "IU" tokens allowed per Update
    Display message.

Example: To update style of the text for item with ID '001' to not crossed and item '002' to
crossed text for the control of the type '01' and ID '001'
`<FS>IU010010010<FS>IU010010021`

Field tokens sent by FPE in response to Update Display 'M' messages

✓   **NOTE:** Field tokens are in the format <FS><Field Token><Data>

Token	Description
II	Results of an item insert into a control (FPE 3.0.010 supports only scrolling receipts list control type)
IR	Results of an item remove from a control (FPE 3.0.010 supports only scrolling receipts list control type)
IU	Results of an item update in a control (FPE 3.0.010 supports only scrolling receipts list control type)

Field tokens sent by FPE in response to Update Display 'M' messages descriptions -

"II" – Results of an item insert into a control
Results of an item insert into the control, if requested by "II" token of Update Display 'M' request.
Refer to Manipulating the scrolling receipts list control items section for more information.

✓   **NOTE:** FPE 3.0.010 supports only one control type ID which is '01' - Scrolling receipts list
    control.

Field	Description	Length	Value
Token	Field ID	2	"II"
Parameter	Control Type ID	2	ASCII numeric: '01'- Scrolling receipts list control
Parameter	Control ID	3	ASCII numeric
Parameter	Return code	1	ASCII numeric (see table below for details)
Data	Inserted Item ID*	0 -3	ASCII numeric '001', '002', etc

*When insert operation failed Item ID in the response will be empty

Return code	Description
'0'	Success
'1'	[Failure] Item ID not found
'2'	[Failure] Maximum number of items excided
'3'	[Failure] Text parameter missing

Example: An item was successfully inserted into control of a type '01' (Scrolling receipts list control) and control ID '001'. ID assigned to the item is '001'
<FS>II010010001

"IR" – Results of an item remove from a control
Results of an item remove from the control, if requested by "IR" token of Update Display 'M' request. Refer to Manipulating the scrolling receipts list control items section for more information

✓ *NOTE:* FPE 3.0.010 supports only one control type ID which is '01' - Scrolling receipts list control.

Field	Description	Length	Value
Token	Field ID	2	"IR"
Parameter	Control Type ID	2	ASCII numeric: '01'- Scrolling receipts list control
Parameter	Control ID	3	ASCII numeric
Parameter	Return code	1	ASCII numeric (see table below for details)

Return code	Description
'0'	Success
'1'	[Failure] Item ID not found

Example: Successfully removed an item with ID '001' from a control of a type '01' (Scrolling receipts list control) and control ID '001' and an item '002' from a control of a type '01' and control ID '002' removal failed.
<FS>IR010010<FS>IR010021

"IU" – Results of an item update in the control
Results of an item update in a control, if requested by "IU" token of Update Display 'M' request. See Manipulating the scrolling receipts list control items section for more information.

✓ *NOTE:* FPE 3.0.010 supports only one control type ID which is '01' - Scrolling receipts list control.

Field	Description	Length	Value
Token	Field ID	2	"IU"
Parameter	Control Type ID	2	ASCII numeric: '01'- Scrolling receipts list control
Parameter	Control ID	3	ASCII numeric
Parameter	Return code	1	ASCII numeric (see table below for details)

Return code	Description
'0'	Success
'1'	[Failure] Item ID not found

'4'	[Failure] Invalid or not supported parameter

Example: First update of the item of control type '01' (Scrolling receipts list control) and control ID '001' succeeded, second update failed.

```
<FS>IU010010<FS>IU010011
```

Update Display example

Request:

```
 <STX>M<FS>C1NThis text goes on pole display line
one<FS>DL0112M10000FA2This text will marquee<ETX><LRC>
```

FPE does not respond other than the protocol ACK.

Response:
None

Manipulating the scrolling receipts list control items

User can use Update Display 'M' request "II", "IU", and "IR" tokens to manipulate the scrolling receipts list control items on Optimum PIN pads running FPE version 3.0.010

Example: to add two items to scrolling receipts list control (Control Type ID is '01') with ID '001' and two items to scrolling receipts list control (Control Type ID is '01') with ID '002'

```
<STX>M<FS>FNRECEIPT<FS>II01001001IItem1 text<FS>II01001001IItem2 text
<FS>II01002001IItem1 text<FS>II01002001IItem2 text <ETX><LRC>
```

Update Display 'M' on Optimum PIN pad allows following operations with the scrolling receipts list control items:

- o [Insert an item or set of items](#) (in one request) into one or several controls
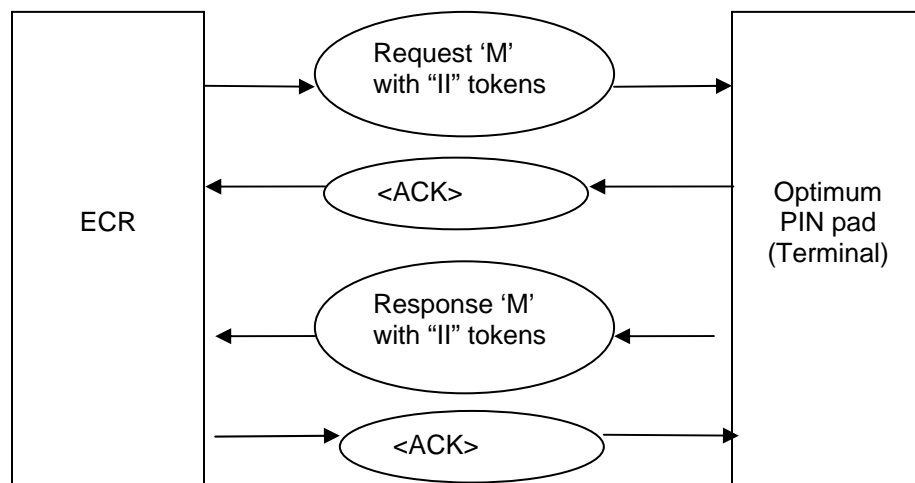
Figure 3 Insert an item

Scenatio1: Insert two items with text 'Item1 text' and 'Item2 text' to the beginning of the scrolling receipts list (control type is '01') with ID '001'.

[Request:](#)

```
<STX>M<FS>FNRECEIPT<FS>II01001000IIItem1 text<FS>II01001000IIItem2 text
<ETX><LRC>
```
FPE responds with results of the insert operation execution.

Response: Two items were successfully (return code in both "II" tokens is '0' - success) inserted into the list with ID equal to '001'. IDs assigned to the items are '001' (for 'Item1 text') and '002' (for 'Item2 text')
```
<STX>M<FS>II010010001<FS>II010010002<ETX><LRC>
```

✓   *NOTE:* Update Display 'M' response will contain same number and the sequence of the "II" tokens as in the request.

Scenatio2: insert item with text 'Item3 text' after item with ID '001' to the scrolling receipts list (control type is '01') with ID '002'.
Request:
```
<STX>M<FS>FNRECEIPT<FS>II01002001AItem3 text<ETX><LRC>
```
FPE responds with results of the insert operation execution.

Response: One item was successfully (return code in "II" token is '0' - success) inserted into the list assigned item ID is '003'
```
<STX>M<FS>II010020003<ETX><LRC>
```

Scenatio3: insert an item with text 'Item4 text' before item with ID '004' to a scrolling receipts control with ID'001'. Scrolling receipts control with ID '001' has items with Ids '001', '003', '002'
Request:
```
<STX>M<FS>FNRECEIPT<FS>II01001004BItem4 text<ETX><LRC>
```
FPE responds with results of the insert operation execution.

Response: Item insert operation failed due to 'Item ID not found' error (return code in "II" token is '1' – "Item ID not found"). Item ID is not available in the response.
```
<STX>M<FS>II010011<ETX><LRC>
```

o   Update an item or set of items (in one request) in one or several controls
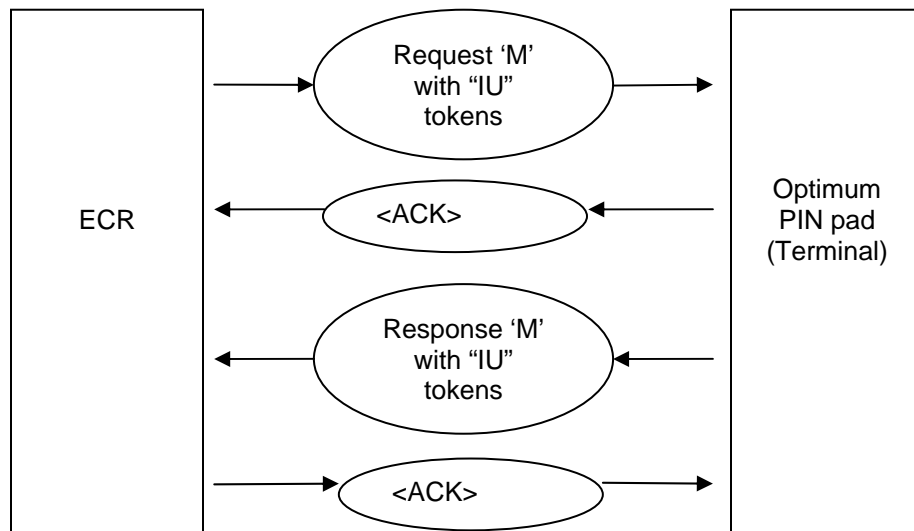
Figure 4 Update an item

Scenatio1: Scrolling receipts list with ID '001' has items with Ids -'001' with text "Item1 text", '002' with text "Item2 text", and '003' with "Item3 text". Update items with ID '001' and '002' in the scrolling receipts list. Item '001' should appear crossed like "~~Item1 text~~", item '002' should be crossed and the text should be "~~NEW Item2 text~~"

Request:
`<STX>M<FS>FNRECEIPT<FS>IU010011001<FS>IU010011002NEW Item2 text<ETX><LRC>`
FPE responds with results of the update operation execution.

Response: Two items were successfully (return code in both "IU" tokens is '0' - success) updated.
`<STX>M<FS>IU010010<FS>IU010010<ETX><LRC>`

✓   *NOTE:* Update Display 'M' response will contain same number and the sequence of the "IU" tokens as in the request.

Scenatio2: Scrolling receipts list with ID '002' has items with IDs -'001' with text "Item1 text", '002' with text "Item2 text", and '003' with text "Item3 text". Update item with IDs '004' and '001' in this scrolling receipts list. Item '004' should appear crossed. Item '001' should appear crossed like "~~Item1 text~~".
Request:
`<STX>M<FS>FNRECEIPT<FS>IU010021004<FS>IU1001<ETX><LRC>`
FPE responds with results of the update operation execution.

Response: Update operation failed due to 'Item ID not found' error (return code in "IU" token is '1' – "Item ID not found") for the first item with ID '004'. Update operation was successful (return code in "IU" tokens is '0' - success) for item '001'.
`<STX>M<FS>IU010021<FS>IU010020<ETX><LRC>`

Scenatio3: Scrolling receipts list with ID '001' has items with IDs -'001' with text "Item1 text", '002' with text "Item2 text", and '003' with "Item3 text". Update item with ID '001'in this scrolling receipts list.
Request:
`<STX>M<FS>FNRECEIPT<FS>IU010012001<ETX><LRC>`
FPE responds with results of the update operation execution.

Response: Update operation failed due to "Invalid or not supported parameter" error (return code in "IU" token is '4' – "Invalid or not supported parameter").
`<STX>M<FS>IU010014<ETX><LRC>`

   o   <u>Remove an item or set of items</u> (in one request) from a control or several controls
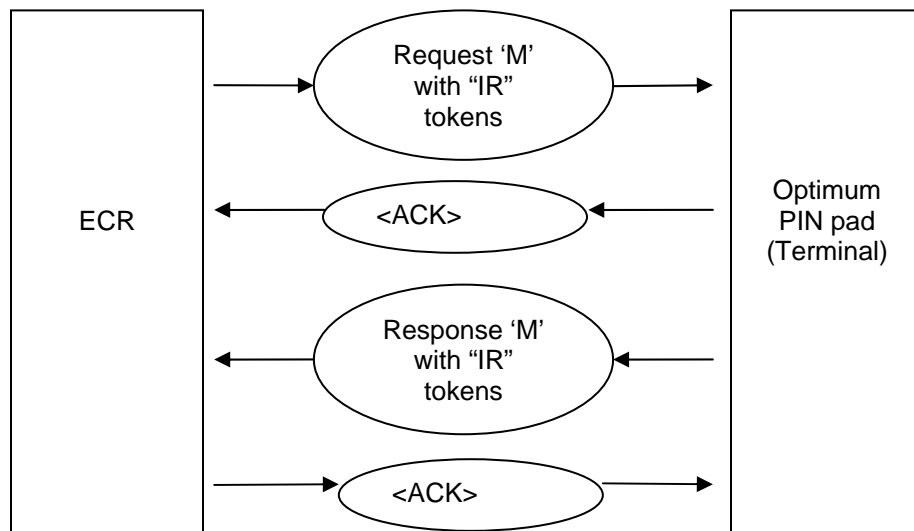
Figure 5 Remove an item

Scenatio1: Scrolling receipts list with ID '001' has items with Ids -'001', '002', '003'. Remove items with IDs '001' and '002' from this scrolling receipts list.

Request:
<STX>M<FS>FNRECEIPT<FS>IR01001001<FS>IR002<ETX><LRC>
FPE responds with results of the remove operation execution.

Response: Two items were successfully (return code in both "IR" tokens is '0' - success) removed from the list with ID '001'.
<STX>M<FS>IR010010<FS>IR010010<ETX><LRC>

✓   *NOTE:* Update Display 'M' message sent in the response will contain same number and the sequence of the "IR" tokens as in the request.

Scenatio2: Scrolling receipts list control with ID '002' has items with Ids -'001', '002', '003'. Remove items with ID '004' from this scrolling receipts list.

Request:
<STX>M<FS>FNRECEIPT<FS>IR01002004<ETX><LRC>
FPE responds with results of the remove operation execution.

Response: Remove operation failed due to "Item ID not found" (return code in both "IR" tokens is '1' – "Item ID not found").
<STX>M<FS>IR010021<ETX><LRC>
Scenatio3: Scrolling receipts list with ID '001' has items with Ids -'001', '002', '003'. Remove all the items from this scrolling receipts list.

Request:
<STX>M<FS>IR01001000*<ETX><LRC>
FPE responds with result of the remove operation execution.

Response: All three items were successfully (return code in both "IR" tokens is '0' - success) removed from the list with ID '001'.
<STX>M<FS>IR010010<ETX><LRC>

Clear All Display Lines 'N'

Clears all displayed text lines set with the "Cn" and "DL" tokens.
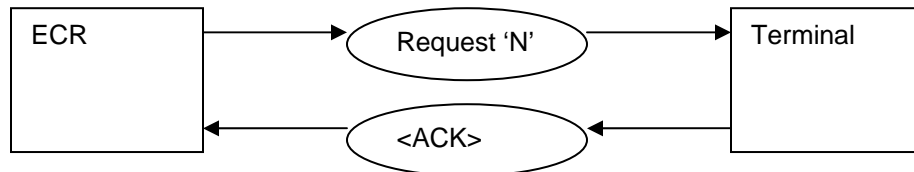
✓ **NOTE:** This request is processed on all types of terminals identically.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'N'

Response

None

Clear All Display Lines example -

Request:
```
<STX>N<ETX><LRC>
```
FPE does not respond other than the protocol ACK.
Response:
None

File Load 'P'

Used to send data files to FPE.
If file is longer than maximum allowed for this request data size (500 byte), a series of File Load 'P' requests has to be send.
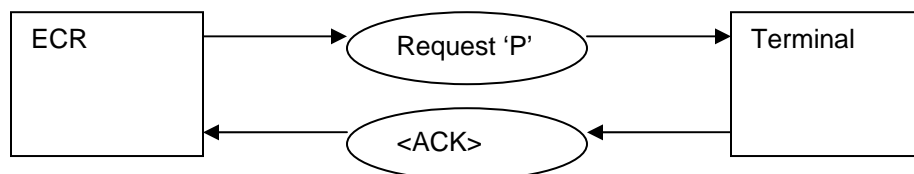
✓ **NOTE:** This request is processed on all types of terminals identically.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'P'
Parameter	More data flag	1	'Y' = more file packets coming 'N' = final file packet
Parameter	Data size	3	ASCII (001 – 950)
Parameter	File name	1 - 256	ASCII
FS	Field separator	1	FS 0x1C

| Data | File data | 1 - 950 | Binary (values 0 – 255) |

Response

None

File Load example -

Request:
 `<STX>PY900IMAGE.DAT<FS><first 900 bytes of file data><ETX><LRC>`
FPE does not respond other than the protocol ACK.
…
`<STX>PN245IMAGE.DAT<FS><last 245 bytes of file data><ETX><LRC>`
FPE does not respond other than the protocol ACK.
Response:
None (see error responses).

Form Information 'Q'

Get information about a form or forms from FPE. Multiple FN tokens may be used.
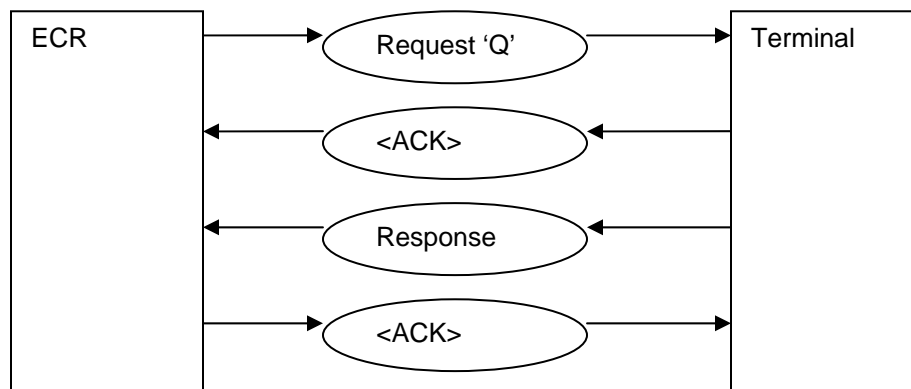
✓   **NOTE:** This request is processed on all types of terminals identically.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'Q'
Parameters	Field tokens	varies	ASCII

Response

Field	Description	Length	Value
Message Type	Message ID	1	'Q'
Data	Form name	1 - 11	ASCII
Data	Form version	4	ASCII numeric
Data	Form creation date	12	ASCII numeric
Data	Separator	1	'/'

Field tokens used in Form Information - 'Q' messages

✓ **NOTE:** Field tokens are in the format <FS><Field Token><Data>

Token	Description
FN	Form Name

Field tokens used in Form Information descriptions -

See field token descriptions under *Form Request* above.

Form Information example -

Request:
  `<STX>Q<FS>FNEDITSCR<FS>FNSIGSCR<ETX><LRC>`
FPE responds with information for all forms requested.
Response:
`<STX>QEDITSCR<SP>1234052301143101/SIGSCR<SP>9999052401122442/<ETX><LRC>`

File Request 'R'

Received from FPE. These messages are sent by FPE when processing the "packinglist" file. After a file named "packinglist" is loaded into the terminal, FPE sequentially reads names and lengths of the files containing screen forms for the terminal. It checks terminals memory and if it does not find a file with the same name and length, sends File Request 'R' to ECR to load the file.
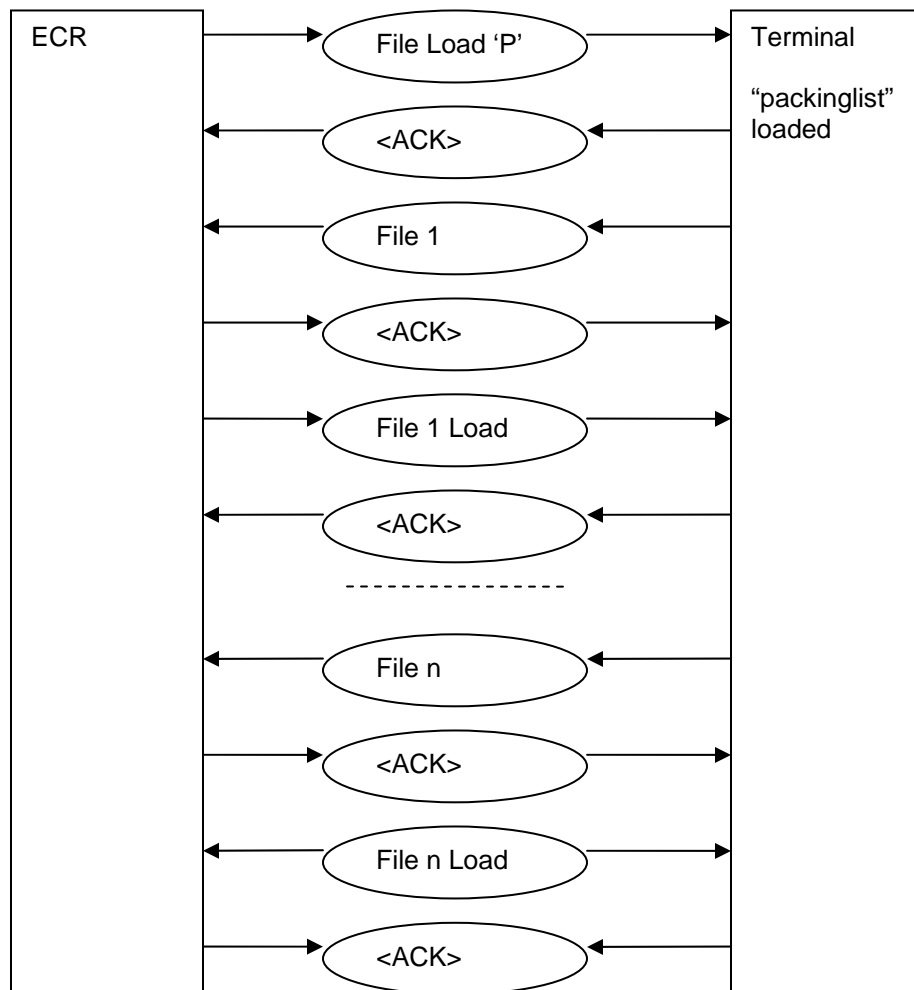
ECR		Terminal
	File Load 'P' →→→	"packinglist" loaded
	←←← <ACK>	
	← File 1 ←	
	<ACK> →→→	
	→ File 1 Load →	
	← <ACK> ←	
	- - - - - - - - - - - - - - -	
	← File n ←	
	<ACK> →→→	
	← File n Load ←	
	→ <ACK> ←	

✓   **NOTE:** This message is the same from all types of terminals.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'R'
Data	File name	1 – 256	ASCII

Response
Respond to FPE with a File Load 'P' message.

File Request example -

Request:
FPE requests -
```
<STX>RLOGO.PCX<ETX><LRC>
```
Response:
ECR responds -
```
<STX>PY500LOGO.PCX<FS><500 bytes of file data><ETX><LRC>
```

Terminal Status 'S'

Get the ready status of FPE.
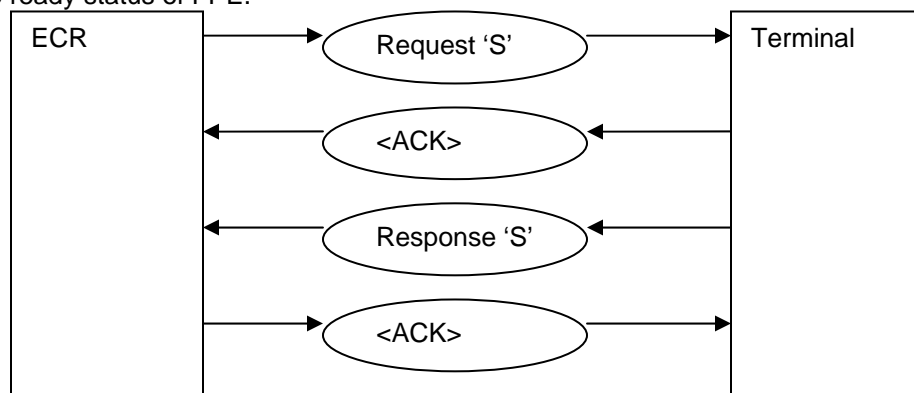
✓ **NOTE:** This token is processed on ICE terminals and may not apply to Symbol payment terminals.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'S'

Response

Field	Description	Length	Value
Message Type	Message ID	1	'S'
Data	Terminal status	1	ASCII numeric: 1 = ready, 0 = busy

Terminal Status example -

Request:
```
<STX>S<ETX><LRC>
```
FPE responds with the current ready status.
Response:
```
<STX>S1<ETX><LRC>
```

Terminal Type 'T'

Get the type of terminal FPE is running on.
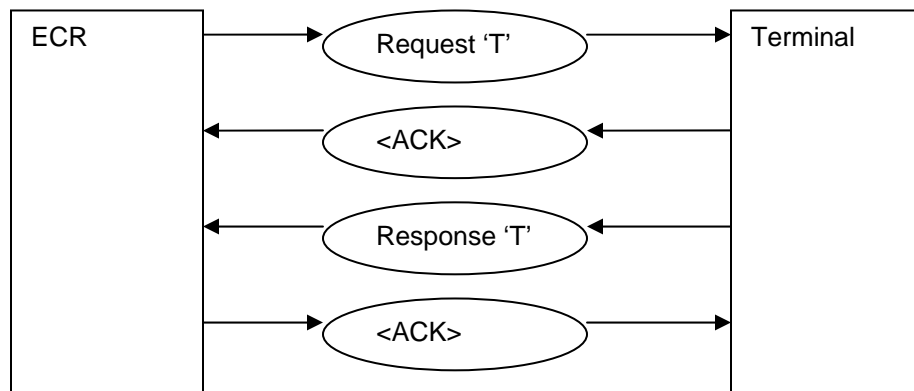
✓ **NOTE:** This request is processed on all types of terminals identically.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'T'

Response

Field	Description	Length	Value
Message Type	Message ID	1	'T'
Data	Terminal type	1	ASCII numeric: 7 = PD8700, A = PD4700, B = PD4750.

Terminal Type example -

Request:
<STX>T<ETX><LRC>
FPE responds with the terminal type.
Response:
<STX>T6<ETX><LRC>

Version Information 'F'

Get FPE, OS and FLASH version information.
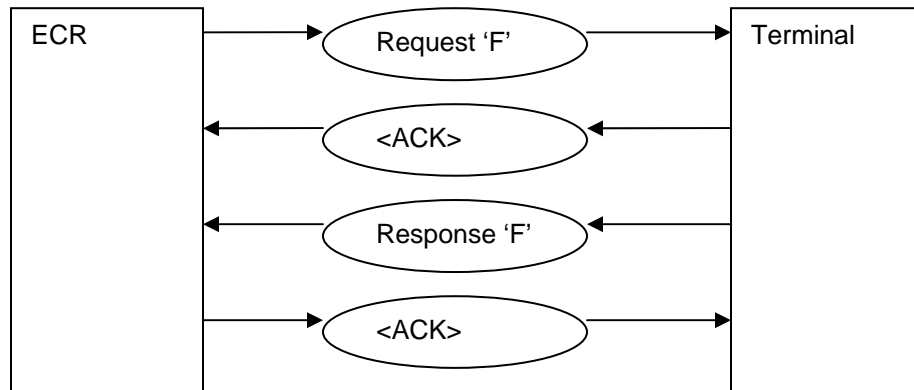
✓ **NOTE:** This request is processed on all types of terminals. Response's format depends on terminal type.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'F'
Parameters	Field tokens	varies	ASCII

Field tokens used in Version Information 'F' messages

✓ **NOTE:** Field tokens are in the format <FS><Field Token><Data>

Token	Description
MV	Minor Version (FPE32 only)
RF	RFID Firmware version (FPE32 only)

Version Information field token descriptions

"MV" – Minor Version (PDxxxx only)

Field	Description	Length	Value
Token	Field ID	2	"MV"
Parameter	Event on/off	1	'Y'es, 'N'o

"RF" – RFID Firmware version (PDxxx only)

Field	Description	Length	Value
Token	Field ID	2	"RF"
Parameter	Event on/off	1	'Y'es, 'N'o

Response

PDxxxx terminals

Field	Description	Length	Value
Message Type	Message ID	1	'F'
Data	FPE application version	4	ASCII numeric
Data	Xilinx version	0 - 20	ASCII
FS	Field separator	1	FS 0x1C
Data	OS & Boot loader version	0 - 36	ASCII
FS	Field separator	1	FS 0x1C
Data	Packing list version	4	ASCII
FS	Field separator	1	FS 0x1C
Data	Terminal serial number	12	ASCII
Parameters	Field tokens	varies	ASCII

Field tokens used Version Information 'F' response

✓ *NOTE:* Field tokens are in the format <FS><Field Token><Data>

Token	Description
MV	Minor version (supported only on PDxxxx PIN pads)
RF	Contactless Card Reader firmware version (supported only on PDxxxx PIN pads)

Field tokens used in Version Information 'F' response

"MV" – Minor Version

Field	Description	Length	Value
Token	Field ID	2	"MV"
Parameter	Minor Version	2-4	ASCII

"RF" – Contactless Card Reader Firmware version

Field	Description	Length	Value
Token	Field ID	2	"RF"
Parameter	Contactless Card Reader Firmware version	0-50	ASCII

Version Information examples

Request to PDxxxx terminal:
```
<STX>F<FS>MVY<ETX><LRC>
```
Response:
```
<STX>F0002C013<FS>OS,20050422,L4100Boot,20041130,x4100
<FS>0001<FS>100004525940
<FS>MV54<ETX><LRC>
```

Request to PDxxxx terminal:
```
<STX>F<FS>RFY<ETX><LRC>
```
Response:
```
<STX>F0002C013<FS>OS,20050422,L4100Boot,20041130,x4100
<FS>0001<FS>100004525940
<FS>RFSCI1 PYPS PIPS VMSD GPMT 9600 050225 012901<ETX><LRC>
```

Hardware Reset '@'

It reboots a terminal.
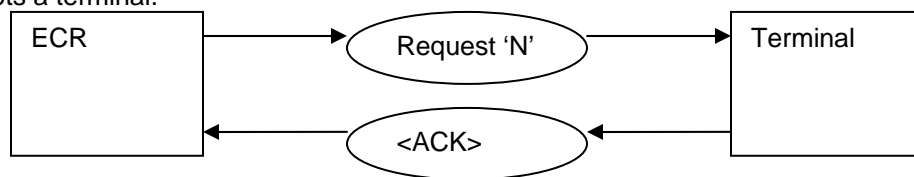
```
┌─────────┐                                    ┌──────────┐
│         │ ──────▶  ( Request 'N' ) ──────▶   │          │
│   ECR   │                                    │ Terminal │
│         │ ◀──────  (   <ACK>    ) ◀──────    │          │
└─────────┘                                    └──────────┘
```

✓   **NOTE:** This request is processed on all types of terminals identically.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'@'

Response

None

Hardware reset example -

Request:
 <STX>@<ETX><LRC>
FPE does not respond other than the protocol ACK.

Response:
None

Error response 'X'

FPE sends this message when an error is encountered while processing a command from the ECR.

✓   **NOTE:** This request is processed on all types of terminals identically.

Response

Field	Description	Length	Value
Message Type	Message ID	1	'X'
Data	Error type	1	ASCII 'C' - Input cancelled 'D' - Device error 'E' - Port open error 'F' - File system error 'L' - Port close failed 'M' - MSR device failed (could not read card) 'N' - Port in use by ECR. Can't open 'O' - Form not found error

			'P' - PIN pad device failed (encryption failed) 'T' - Frequent shopper MSR error (could not read card) 'W' - Port write error

Error response example -

Request:
<STX>PY500IMAGE.DAT<491 bytes of file data><ETX><LRC>
FPE was unable to store the file and responds with a File System Error 'F' response.
Response:
<STX>XF<ETX><LRC>

TCPIP-ACK 'Z'

Sent by FPE when connected by TCP/IP in response to a message that has no other response such as the
Return to Idle 'A' message. The ECR should not send the next message to FPE until it receives the normal message response or this message.

Field	Description	Length	Value
Message Type	Message ID	1	'Z'

Request:
<STX>A<FS>FNIDLEFRM<FS>CPY<ETX><LRC>

FPE sends a TCPIP-ACK in response because the command has no other response.

Response:
<FP><0x01><0x00>Z

Keyboard Lock '_'

Locks or unlocks the keypad. Unlock turns on all keys. Lock turns off the keys specified in the key set parameter.

✓ **NOTE:** This request is processed on ICE terminals and may not apply to Symbol payment terminals.

Field	Description	Length	Value
Message Type	Message ID	1	'_'

Field	Description	Length	Value
Data	Lock/Unlock	1	'L' = Lock 'U' = Unlock
Data	Key set	1	'A' = All, 'N' = Numeric

Keyboard Lock/Unlock Examples

Request:
<STX><Keyboard_Lock >LA<ETX><LRC>
Response:
<ACK> (or <NAK>)

Set NMS IPConfig '^'

Used to set NMS address for program loads.
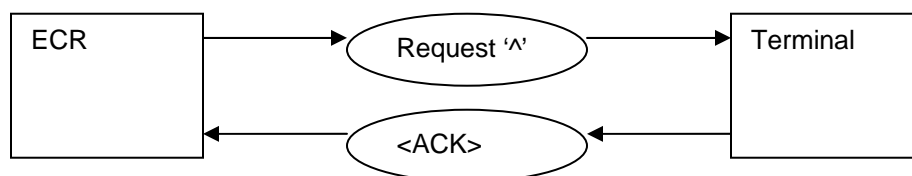
✔ **NOTE:** This token is processed on ICE 6K terminals and may not apply to Symbol payment terminals.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'^'
Parameters	Field tokens	varies	ASCII

Field tokens used in Set NMS IPConfig '^' messages

✔ **NOTE:** Field tokens are in the format <FS><Field Token><Data>

Token	Description
IP	IP Address
PN	Port number

Set NMS IPConfig command field token descriptions

"IP" – IP address

Field	Description	Length	Value
Token	Field ID	2	"IP"
Parameter	IP address	varies	ASCII Numeric. IP address stored most significant byte first

"PN" - Port number

Field	Description	Length	Value
Token	Field ID	2	"PN"
Parameter	Port number	varies	ASCII Numeric. IP port number stored most significant byte first

Response

None

Set NMS IPConfig example -

Request:
<STX>^<FS>IP-1073544703<FS>PN64255<ETX><LRC>
FPE does not respond other than the protocol ACK.
Response:
None

POS Event `'`

Received from FPE. These messages are sent by FPE to notify host of button pressing or card swiping. They are sent only if corresponding global parameter was set.
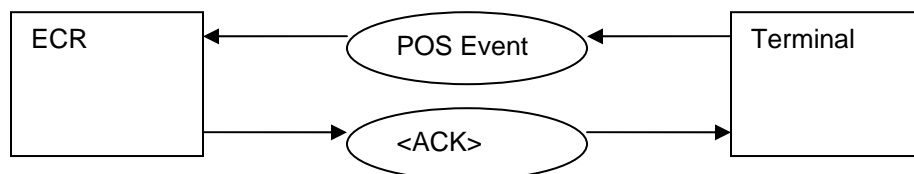
```
┌─────────┐        ╭───────────────╮        ┌──────────┐
│  ECR    │◄───────│   POS Event   │◄───────│ Terminal │
│         │        ╰───────────────╯        │          │
│         │        ╭───────────────╮        │          │
│         │───────►│     <ACK>     │───────►│          │
└─────────┘        ╰───────────────╯        └──────────┘
```

✓   *NOTE:* This message is the same from all types of terminals.

Request

Field	Description	Length	Value
Message Type	Message ID	1	`'` (0x60)
Parameters	Field tokens	varies	ASCII

Field tokens used in POS Event `'` messages

✓   *NOTE:* Field tokens are in the format <FS><Field Token><Data>

Token	Description
KD	Keyboard button
KB	Form button
T	Track data
TS	Track data source
TM	Track read error

POS Event command field token descriptions

"KD" – Keyboard button

Field	Description	Length	Value
Token	Field ID	2	"KD"
Parameter	Key code	1	ASCII character code

Example: <FS>D1

"KB" – Form button

Field	Description	Length	Value
Token	Field ID	2	"KB"
Parameter	Key code	1	ASCII button code

Example: <FS>KB

"XM" - Track read error

Field	Description	Length	Value
Token	Field ID	2	"XM"

Example: <FS>XM

✓ **NOTE:** In FPE earlier than v3.0.020 this message is sent after 3rd "bad" card swipes (Track Reads).

"T" – Track data

Field	Description	Length	Value
Token	Field ID	1	'T'
Parameter	Track ID	1	ASCII numeric '1' '2' '3' '4'
Data	Track data	Track 1 - 79 Track 2 - 40 Track 3 - 100 Track 4 - 100	ASCII and ASCII numeric

Example: <FS>T1B4012000000001^HYPERCOM/TEST CARD^050201234567890
Example: <FS>T24012000000001=050201234567890
Example: <FS>T3HYPERCOM TEST CARD 1234567890

Response
Respond to FPE with <ACK>

Key notification example –
Request:
FPE requests -
 <STX>'<FS>D2<ETX><LRC>

Response:
ECR responds -
ECR does not respond other than the protocol ACK.

"TS" – Track data source
Track data source, if requested by "TS" token of "V" request.

Field	Description	Length	Value
Token	Field ID	2	"TS"
Data	Track data source	1	'0' - TRACK_READER '1' - RDIF_EXPRESS_PAY '2' - RFID_PAY_PASS '3' - RFID_VISA_WAVE '4' - RFID_UNKNOWN_APP

Example: <FS>TS1

Screen Protector Status 'a'

Received from FPE (PD87xx and PD4750 only). This message is sent by FPE to notify ECR about screen protector status change or as regular notifications with specified interval. Interval is assigned by sending 'G' command to the terminal and specifying desired interval by means of 'SP' parameter.
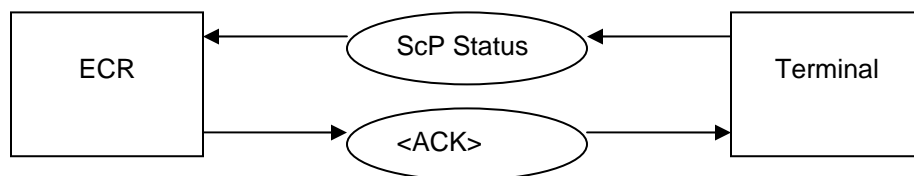
Request

Field	Description	Length	Value
Message Type	Message ID	1	'a' (0x61)
Data	Screen Protector on/off	1	'Y' - On, 'N' - Off
Data	Number of days elapsed without screen protector	2	ASCII numeric
Data	Number of days left for the next reminder	2	ASCII numeric

Screen Protector Status example –

Request:
FPE requests -
 <STX>aN0503<ETX><LRC>

✓   **NOTE:** In this example terminal does not have screen protector installed. It has spent 5 days without screen protector and the next reminder will take place in 3 days.

Response:
ECR does not respond other than the protocol ACK.

Setup Parameters 'p'

Setup Parameters 'p' message should be used to configure device settings, such as password to enter Setup Mode (Setup Password), enable/disable PowerUp message, configure HTMS connection, activate PIN pad setup functionality, and etc.
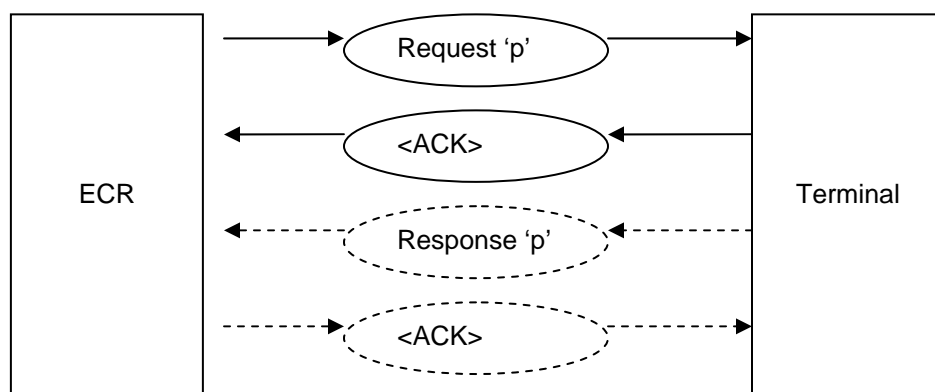
Terminal sends response message only if request has "QP" , "QU", "QHTMS", "CC", "CL", "TL", "TD", and "CP" tokens.

✓   **NOTE:** This request is processed on PDxxxx terminals only.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'p'
Parameters	Field tokens	varies	ASCII

Field tokens used in Setup Parameters 'p' request

✓ *NOTE:* Field tokens are in the format <FS><Field Token><Data>

Token	Description
PW	Set new password
QP	Query current password
PU	Set PowerUp message sending
QU	Query PowerUp parameter
PHTMS	Set HTMS connection configuration
QHTMS	Query HTMS connection configuration
CC	Contrast Setup (Configure Contrast)
CL	Touch screen calibration (Configure Calibration)
TL	Touch screen calibration Test (Test Calibration)
TD	DUKPT Encryption (Test DUKPT)
CP	ECR port configuration (Configure Port)

Field tokens used in Setup Parameters descriptions

"PW" – Set New Password
This token should be used to set Setup Screen password

✓ *NOTE:* If the password is empty, default password MULTILANE will be used.

Field	Description	Length	Value
Token	Field ID	2	"PW"
Data	Password	0-10	ASCII character code

Example: <FS>PWHYPERCOM

"QP" – Query current password
This token should be used to request plain-text value on setup screen

Field	Description	Length	Value
Token	Field ID	2	"QP"

Example: <FS>QP

"PU" – Set PowerUp parameter
This parameter enables/disables PowerUp message sending

Field	Description	Length	Value
Token	Field ID	2	"PU"
Parameter	Enable or disable (Y/N)	1	'Y' or 'N'

	PowerUp message		

Example: <FS>PUY

"QU" – Query PowerUp parameter
This parameter identifies whether PowerUp message sending is enabled or disabled

Field	Description	Length	Value
Token	Field ID	2	"QU"

Example: <FS>QU

"PHTMS" – Set HTMS connection configuration

Field	Description	Length	Value
Token	Field ID	5	"PHTMS"
Parameter	Enable or disable (Y/N) HTMS connection	1	'Y' or 'N'
Parameter	IP address of HTMS	varies	ASCII
Parameter	Port of HTMS	varies	ASCII numeric

✓   *NOTE:* Field data parameters are separated by '/'.
Example: <FS>PHTMSY/192.168.0.1/5112

"QHTMS" – Query HTMS connection configuration

Field	Description	Length	Value
Token	Field ID	5	"QHTMS"

Example: <FS>QHTMS

"CC" – Contrast Setup (Configure Contrast)

Field	Description	Length	Value
Token	Field ID	2	"CC"
FS	Field Separator	1	FS 0x1C
Token	Field ID (Timeout)	2	"TO"
Data	Timeout period in seconds	1-3	ASCII Numeric. "999" to wait for ever for user input "000" for returning back the existing parameter any value < "999" will be set as timeout period
FS	Field Separator	1	FS 0x1C
Token	Field ID (Form Name)	2	"FN"
Data	Form Name	varies	ASCII

✓   *NOTE:* If "Form Name" is omitted from the request, then default form "DSPCONTRAST" will be used.

Example: to request device contrast configuration, where: "DSPCONTRAST" - is the name of the custom form/screen to open for configuring contrast, "60" - timeout period in seconds
```
<STX>p<FS>CC<FS>TO60<FS>FNDSPCONTRAST<ETX><LRC>
```

"CL" – Touch screen calibration (Configure Calibration)

Field	Description	Length	Value
Token	Field ID	2	"CL"
FS	Field Separator	1	FS 0x1C
Token	Field ID (Timeout)	2	"TO"
Data	Timeout period in seconds	1-3	ASCII Numeric. "999" to wait for ever for user input "000" for returning back the existing parameter any value < "999" will be set as timeout period
FS	Field Separator	1	FS 0x1C
Token	Field ID (Form Name)	2	"FN"
Data	Form Name	varies	ASCII

Comments: If "Form Name" is omitted from the request, then the default calibration form built into PIN pad application, named "CALIBRFRM", will be displayed.

Example: to request device touch screen calibration, where: "CALIBRFRM" - a name of the custom form/screen for configuring calibration, "60"- operation timeout in seconds
<STX>p<FS>CL<FS>TO60<FS>FNCALIBRFRM<ETX><LRC>

"TL" – Touch screen calibration Test (Test Calibration)

Field	Description	Length	Value
Token	Field ID	2	"TL"
FS	Field Separator	1	FS 0x1C
Token	Field ID (Timeout)	2	"TO"
Data	Timeout period in seconds	1-3	ASCII Numeric. "999" to wait for ever for user input "000" for returning back the existing parameter any value < "999" will be set as timeout period
FS	Field Separator	1	FS 0x1C
Token	Field ID (Form Name)	2	"FN"
Data	Form Name	varies	ASCII

Comments: If "Form Name" is omitted from the request, then the default calibration form built into PIN pad application, named "CALIBRFRM", will be displayed.

Example: to request device touch screen calibration test, where: "CALIBRFRM" - a name of the custom form/screen for testing calibration, "60"- operation timeout in seconds
<STX>p<FS>TL<FS>TO60<FS>FNCALIBRFRM<ETX><LRC>

"TD" – DUKPT Encryption (Test DUKPT)

Field	Description	Length	Value
Token	Field ID	2	"TD"
FS	Field Separator	1	FS 0x1C
Token	Field ID (Timeout)	2	"TO"
Data	Timeout period in seconds	1-3	ASCII Numeric. - "999" to wait for ever for user input - "000" for sending response with current KSN, PIN and other values - any value < "999" will be set as timeout period
FS	Field Separator	1	FS 0x1C
Token	Field ID (Form Name)	2	"FN"
Data	Form Name	varies	ASCII

Comments:
- o   To omit the "Form Name" from the request is same as specify "000" parameter in "Timeout period" field (a response with values currently set will be sent immediately without displaying DUKPT Encryption test form on the PIN pad).
- o   It is recommended to use default DUKPT encryption test form, named "DUKPTNEW", built into PIN pad application.
- o   If a custom form should be used for DUKPT Encryption test , the following three forms should be available on the PIN pad:
     1) A form for Account and PIN input.
     2) A form for displaying successful encryption results. Assuming that the name of the form specified in 1) is "<name>", then the name of this form should be like "<name>2"
     3) A form for displaying unsuccessful encryption result. If a name of the form specified in 1) is "<name>", then the name of this form should be like "<name>3".

Example: to request DUKPT encryption test, where: "DUKPTNEW" - a name of the custom form/screen for DUKPT encryption test, "60"- operation timeout in seconds
<STX>p<FS>TD<FS>TO60<FS>FNDUKPTNEW<ETX><LRC>

"CP" – ECR port configuration

Field	Description	Length	Value
Token	Field ID	2	"CP"
FS	Field Separator	1	FS 0x1C
Token	Field ID (Timeout)	2	"TO"
Data	Timeout period in seconds	1-3	ASCII Numeric. - "999" to wait for ever for user input - "000" for returning back the existing parameter - any value < "999" will be set as timeout period
FS	Field Separator	1	FS 0x1C
Token	Field ID (Form Name)	2	"FN"
Data	Form Name	varies	ASCII

Comments:
- o To omit the "Form Name" from the request is same as specify "000" parameter in "Timeout period" field (a response with values currently set will be sent immediately without displaying DUKPT Encryption test form on the PIN pad).
- o It is recommended to use default ECP port configuration form, named "ECRSETUP", built into PIN pad application.

Example: to request ECR port configuration, where: "ECRSETUP" - a name of the custom form/screen for port configuration, "60"- operation timeout in seconds
<STX>p<FS>CP<FS>TO60<FS>FNECRSETUP<ETX><LRC>

Response

For requests that contain "PW" and/or "PU" tokens FPE does not respond other than the protocol ACK.
If "QP" and/or "QU" token present in a request, then terminal responds with 'p' message containing queried value(s).

Field	Description	Length	Value
Message Type	Message ID	1	'p'
Data	Field tokens	varies	ASCII

Field tokens used in Setup Parameters 'p' response

✓ *NOTE:* Field tokens are in the format <FS><Field Token><Data>

Token	Description
PW	Current password
PU	Current PowerUp parameter value
PHTMS	Current HTMS connection configuration
CC	Contrast Setup (Configure Contrast)
CL	Touch screen calibration (Configure Calibration)
TL	Touch screen calibration Test (Test Calibration)
TD	DUKPT Encryption (Test DUKPT)
CP	ECR port configuration (Configure Port)

"PW" – Current password
Response to the Setup Parameters 'p' request with token "QW" will contain this field token.

Field	Description	Length	Value
Token	Field ID	2	"PW"
Data	Password	0-10	ASCII

Example: <FS>PWHYPERCOM

"PU" – Current PowerUp parameter value
Response to the Setup Parameters 'p' request with token "QU" will contain this field token.

Field	Description	Length	Value
Token	Field ID	2	"PU"
Data	Value of PowerUp parameter	1	'Y' (PowerUp message enabled) or 'N' (PowerUp message disabled)

"PHTMS" – Current HTMS connection configuration

Response to the Setup Parameters 'p' request with token "QHTMS" will contain this field token.

Field	Description	Length	Value
Token	Field ID	5	"PHTMS "
Data	HTMS connection Enabled or disabled (Y/N)	1	'Y' (enabled) or 'N' (disabled)
Data	IP address of HTMS	varies	ASCII
Data	Port of HTMS	varies	ASCII numeric

✓ *NOTE:* Field data is separated by '/'.

Example: <FS>PHTMSY/192.168.0.1/5112

"CC" – Contrast Setup (Configure Contrast)

Field	Description	Length	Value
Token	Field ID	2	"CC"
FS	Field Separator	1	FS 0x1C
Token	Field ID (New Value)	2	"NV"
Data	New contrast value	1-3	ASCII Numeric
FS	Field Separator	1	FS 0x1C
Token	Field ID (Previous Value)	2	"PV"
Data	Previous contrast value	1-3	ASCII Numeric

Example: contrast configuration response, which contains information of the new contrast value set to 28 and previous value as 32

    <STX>p<FS>CC<FS>NV28<FS>PV32<ETX><LRC>

"CC" - Contrast Setup timeout

Field	Description	Length	Value
Token	Field ID	2	"CC"
FS	Field Separator	1	FS 0x1C
Token	Timeout	2	"TO"

Example: timeout response
<STX>p<FS>CC<FS>TO<ETX><LRC>

"CL" – Touch screen calibration

Field	Description	Length	Value
Token	Field ID	2	"CL"
FS	Field Separator	1	FS 0x1C
Data	Return code	1	ASCII chars: 'T' (Success) - "Calibration Passed" 'F' (Failure) – "Calibration Failed'

Example: touch screen calibration response, when operation is successful.
<STX>p<FS>CL<FS>T<ETX><LRC>

"CL" – Touch screen calibration timeout

Field	Description	Length	Value
Token	Field ID	2	"CL"
FS	Field Separator	1	FS 0x1C
Token	Timeout	2	"TO"

Example: timeout response
<STX>p<FS>CL<FS>TO<ETX><LRC>

"TL" – Touch screen calibration test

Field	Description	Length	Value
Token	Field ID	2	"TL"
FS	Field Separator	1	FS 0x1C
Data	Return code	1	ASCII chars: 'T' (Success) - "Calibration test passed" 'F' (Failure) – "Calibration test failed'

Example: touch screen calibration test response, when operation is successful.
<STX>p<FS>TL<FS>T<ETX><LRC>

"TL" – Touch screen calibration test timeout

Field	Description	Length	Value
Token	Field ID	2	"TL"
FS	Field Separator	1	FS 0x1C
Token	Timeout	2	"TO"

Example: timeout response
<STX>p<FS>TL<FS>TO<ETX><LRC>

"TD" – DUKPT Encryption

Field	Description	Length	Value
Token	Field ID	2	"TD"
FS	Field Separator	1	FS 0x1C
Token	Field ID (Pin Data)	2	"PD"
Data	Pin Block	16	ASCII
FS	Field Separator	1	FS 0x1C
Token	Field ID (KSN parameter)	2	"KS"
Data	KSN #	20	ASCII

Example: response to the DUKPT encryption test request
<STX>p<FS>TD<FS>PD1234567890ABCDEF<FS>KS 1234567890ABCDEF1234<ETX><LRC>

Example: Encryption Failed Response. See Error response 'X' description for details.
<STX>XP<ETX><LRC>

"TD" – DUKPT Encryption timeout

Field	Description	Length	Value
Token	Field ID	2	"TD"
FS	Field Separator	1	FS 0x1C

Token	Timeout	2	"TO"

Example: timeout response
```
<STX> p<FS>TD<FS>TO<ETX><LRC>
```

"CP" – ECR port configuration (Configure Port)

Field	Description	Length	Value
Token	Field ID	2	"CP"
FS	Field Separator	1	FS 0x1C
Token	Field ID (Previous Port)	2	"PP"
Data	Previous Port	varies	ASCII
FS	Field Separator	1	FS 0x1C
Token	Field ID (New Port)	2	"NP"
Data	New Port	varies	ASCII
If New Port is TCP/IP			
FS	Field Separator	1	FS 0x1C
Token	Field ID (IP Address)	2	"IP"
Data	IP Address	varies	ASCII
FS	Field Separator	1	FS 0x1C
Token	Field ID (Port No)	2	"PO"
Data	Port No	varies	ASCII
If New Port is Serial			
FS	Field Separator	1	FS 0x1C
Token	Field ID (Baud Rate)	2	"BR"
Data	Baud Rate	varies	ASCII
FS	Field Separator	1	FS 0x1C
Token	Field ID (Parity)	2	"PA"
Data	Parity	varies	ASCII
FS	Field Separator	1	FS 0x1C
Token	Field ID (Data Bits)	2	"DB"
Data	Data Bits	1	ASCII Numeric
Token	Field ID (Stop Bits)	2	"SB"
Data	Stop Bits	1	ASCII Numeric
Token	Field ID (Flow Control)	2	"FC"
Data	Flow Control	varies	ASCII
If New Port is USB then no further configuration required			

Example: ECR port configuration responses
- when new port is Serial
```
<STX>p<FS>CP<FS>PPTCP/IP<FS>NPSerial<FS>BR19200<FS> PANone<FS>DB8
<FS>SB1<FS>FCNone<ETX<LRC>
```
- when new port is TCP/IP
```
<STX>p<FS>CP<FS>PPSerial<FS>NPTCP/IP<FS> IP172.16.0.12
<FS>PO5112<ETX><LRC>
```
- when new port is USB
```
<STX>p<FS>CP<FS>PPSerial<FS>NPUSB<ETX><LRC>
```

"CP" – ECR port configuration timeout

Field	Description	Length	Value
Token	Field ID	2	"CP"
FS	Field Separator	1	FS 0x1C

Token	Timeout	2	"TO"

Example: timeout response
```
<STX>p<FS>CP<FS>TO<ETX><LRC>
```

Setup Parameters examples –

Request:
```
<STX>p<FS>PWMULTILANE <ETX><LRC>
```
FPE does not respond other than the protocol ACK.

Request:
```
<STX>p<FS>PUY<ETX><LRC>
```
FPE does not respond other than the protocol ACK.

Request:
```
<STX>p<FS>QP<ETX><LRC>
```
Response:
```
<STX>p<FS>PWMULTILANE<ETX><LRC>
```

Request:
```
<STX>p<FS>QU<ETX><LRC>
```
Response:
```
<STX>p<FS>PUY<ETX><LRC>
```

Request:
```
<STX>p<FS>QHTMS<ETX><LRC>
```
Response:
```
<STX>p<FS>PHTMSY/192.168.0.1/5112<ETX><LRC>
```

Beeper control 'b'

This message causes the terminal to sound beep with specified duration.
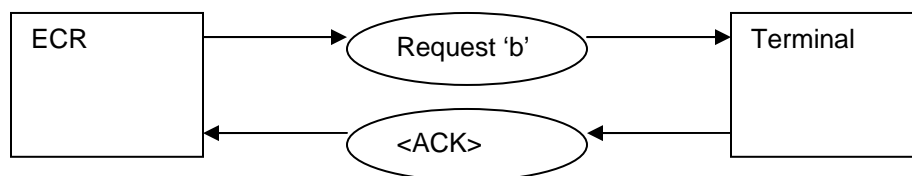
✓ *NOTE:* This token is processed on all Optimum PIN pads (PDxxxx).

Request

Field	Description	Length	Value
Message Type	Beeper_Control	1	'b'
Data	Duration in 1/10 of a second	2	ASCII Numeric 01-99

Response
None

Examples
Request:
           <STX>b10<ETX><LRC>
Response:
           None

PowerUp message 'r'

FPE sends this message on power up (on terminal enter of the CLOSED state after restart) to ECR.

   ✓   ***NOTE:*** These messages should be enabled by <u>Setup Parameters 'p'</u> message with "PU" token field.

Example:
<STX>p<FS>PUY<ETX><LRC>
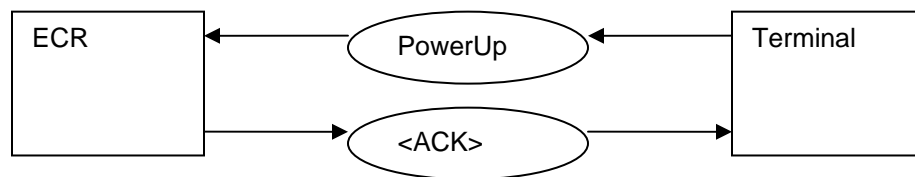
   ✓   ***NOTE:*** This message is supported only on PDxxxx platform.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'r' (0x72)

Response

None

PowerUp message example
Request:
FPE requests -
 <STX>r<ETX><LRC>
Response:
None
ECR does not respond other than the protocol ACK.

UPOS Statistics 'u'
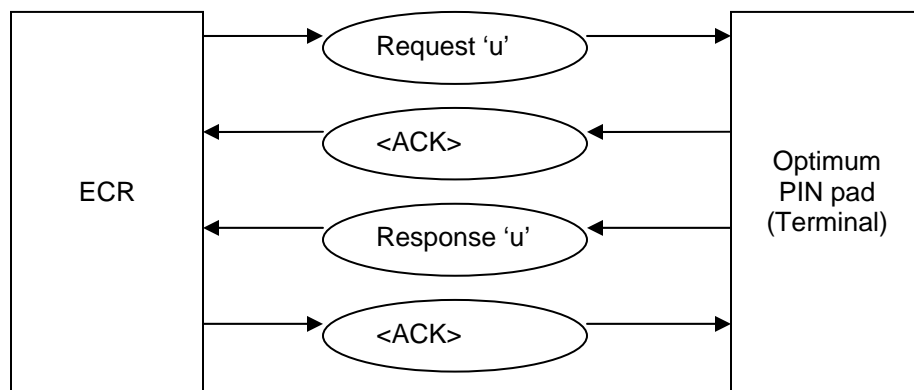
✓ **NOTE:** This request is processed on Optimum PDxxxx terminals only.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'u'
Parameters	Field tokens	varies	ASCII

Response

Field	Description	Length	Value
Message Type	Message ID	1	'u'
Data	Field tokens	varies	ASCII

Field tokens used in UPOS Statistics messages

✓ **NOTE:** Field tokens are in the format `<FS><Field Token><Data>`

Token	Description
"RT"	Retrieve Statistics
"RS"	Reset Statistics

Field tokens used in UPOS Statistics descriptions –

"RT"- Retrieve Statistics

Field	Description	Length	Value
Token	Field ID	2	"RT"
Parameter	Parameter string as specified in UPOS 1.8 (see note below for details)	varies	ASCII chars

✓ **NOTE:** This is a comma-separated list of name(s), where an empty string ("") means ALL statistics are to be retrieved, "U_" means all UnifiedPOS defined statistics are to be retrieved, "M_" means all manufacturer defined statistics are to be retrieved, and "actual_name1, actual_name2" (from the XML file definitions) means that the specifically defined statistic(s) are to be retrieved.

Example: `<FS>RT…`

"RS"- Reset Statistics

Field	Description	Length	Value
Token	Field ID	2	"RS"
Parameter	Parameter string as specified in UPOS 1.8 (see note below for details)	varies	ASCII chars

✓ **NOTE:** This is a comma-separated list of name(s), where an empty string ("") means ALL statistics are to be retrieved, "U_" means all UnifiedPOS defined statistics are to be retrieved, "M_" means all manufacturer defined statistics are to be retrieved, and "actual_name1, actual_name2" (from the XML file definitions) means that the specifically defined statistic(s) are to be retrieved.

Example: `<FS>RS…`

Field tokens sent by FPE in response to UPOS Statistics messages

✓ **NOTE:** Field tokens are in the format <FS><Field Token><Data>

Token	Description
"RT"	Retrieve Statistics
"RS"	Reset Statistics

Field tokens sent by FPE in response to UPOS Statistics descriptions -

"RT"- Retrieve Statistics

Field	Description	Length	Value
Token	Field ID	2	"RT"
Data	Return code	1	ASCII numeric (see table below for details)

Return code	Description
'0'	Success. XML-format file with statistics info successfully created on the PIN pad
'1'	[Failure] Failed to create XML-format file with statistics on the PIN pad

Example: `<FS>RT1`

"RS"- Reset Statistics

Field	Description	Length	Value
Token	Field ID	2	"RS"
Data	Return code	1	ASCII numeric '0' = success

Example: `<FS>RS1`

File download 'd'

This message should be used to load data files from the device onto the ECR or PC.

Request

Field	Description	Length	Value
Message Type	Message ID	1	'd'
Parameters	Field tokens	Varies	ASCII

Response

Field	Description	Length	Value
Message Type	Message ID	1	'd'
Data	Field tokens	varies	ASCII

Field tokens used in File download 'd' message

✓ *NOTE:* Field tokens are in the format <FS><Field Token><Data>

Token	Description
'G'	Get file
'L'	Request file(s) information

Field tokens used in File Download descriptions -
'G' – Get file

Field	Description	Length	Value
Token	Message ID	1	'G'
Parameter	File name	1 - 256	ASCII

Example:
```
<STX>d<FS>GERROR.log<ETX><LRC>
```

'L' – Request file(s) information

Field	Description	Length	Value
Token	Message ID	1	'L'
Parameter	Directory or file name	1 - 256	ASCII

✓ *NOTE:* If directory or file name has relative path it will be prefixed by C:\.

Example:
```
<STX>d<FS>Ld:\<ETX><LRC>
```

Field tokens sent by FPE in response to File download 'd' messages

✓ *NOTE:* Field tokens are in the format <FS><Field Token><Data>

Token	Description
'G'	File data
'L'	File(s) information

Field tokens sent by FPE in response to File Download Requests descriptions -
'G' – File data

Field	Description	Length	Value
Token	Field ID	1	'G'
Parameter	Return code	1	ASCII numeric (see table below)
Parameter	More data flag	1	'Y' - more file packets are coming 'N' - final file packet
Parameter	Data size	3	ASCII numeric (001 – 999)
Parameter	File name	1 -256	ASCII
FS	Field separator	1	FS 0x1C
Data	File data	1 - 999	Binary (values 0 – 255)

Return code	Description
'0'	Success
'1'	[Failure] File not found

'L' - File(s) information

Field	Description	Length	Value
Token	Field ID	1	'L'
Parameter	Return code	1	ASCII numeric (see table above)
Parameter	String in the following format: "<file name>\t<type>\t<size>\n", where <file name> - name of the file or directory (without path information), <type> - 'F' – file or 'D' – directory, and size in bytes.	varies	ASCII

✓   **NOTE:** If request contains directory name information for all files/directories in given directory is returned.

Customer activation -

These forms are needed for customer activation. They must be created using the Form Builder tool and downloaded to FPE before entering the customer activated mode.

IDLEFRM – Displayed at the IDLE state.
GETTENDFRM – Displayed at the GetTender state.
BADSWIPE – Displayed when a bad card swipe occurs.
CLOSEDFRM – The first form displayed after a power cycle. Use to stop customer activation.
FREQSHPFRM – Displayed at the FreqShopper state.
WAITFRM – Displayed at the Wait state (after all customer data is entered).

Customer activation starts in the "IDLE"state when the Return to Idle 'A' message is sent to FPE. Send a Form Request 'V' message with the Form Name token "FN" set to CLOSEDFRM to exit customer activation. Before FPE's customer activated mode is enabled by sending the Return to Idle 'A' command, the application needs to be configured by sending Configure Tender 'E' messages for any tender types needed. One message is sent to FPE for each tender type desired. The global parameters 'G' message should be sent to set the desired first action (the action that will cause an exit from the IDLE state – tender selection or swipe card). After configuration, send the return to idle 'A' message to start customer activation. If the optional Idle Form Name "FN" token is not included in this message FPE will display IDLEFRM. Use the Poll Customer Data 'J' message to determine which customer activated state FPE is currently preocessing and for collecting any data entered by the customer. At any point the host application (ECR) may interrupt customer activation and "take over driving" the customer through data entry. To do this just send Form Request 'V' messages and process the response messages.

If first action in the customer activation is 'card swipe' or 'either' and user uses the RFID card the terminal skips the tender selection screen, automatically make the transaction and credit.

Customer activated state machine definition –

State	Event	Action
IDLE	Init	Display IDLEFRM or form specified in 'A' message.
	Swipe card	Transition to GetTender
	Tender selection	EBT selected - Transition to SelectEBT
		Any other tender type - Transition to GetMSR

State	Event	Action
GetTender	Init	Display GETTENDFRM
	Tender selection	EBT – Transition to SelectEBT
		Default – If purchase balance prompting is on for this tender transition to PurchaseBalance. Else if PIN encryption is on for this tender transition to GetPIN. Else if cash back is on for this tender transition to the state to get the configured cash back type (CBClerk, CBKeyboard or CBButtons). Else if frequent shopper is on for this tender transition to FreqShopper. Else transition to Wait.
	Cancel	Transition to IDLE

State	Event	Action
SelectEBT	Init	Display the "swipe form" for the current tender
	Tender selection	If a card was swiped prior to entering this state – If purchase balance prompting is on for this tender transition to PurchaseBalance. Else if PIN encryption is on for this tender transition to GetPIN. Else if cash back Yes/No prompting is on for this tender transition to CBYesNo. Else if cash back is on for this tender transition to the state to get the configured cash back type (CBClerk, CBKeyboard or CBButtons).). Else if frequent shopper is on for this tender transition to FreqShopper. Else transition to Wait. If no card has been swiped – Transition to GetMSR.
	Cancel	Transition to IDLE.

State	Event	Action
GetMSR	Init	Display the "swipe form" for the current tender
	Card swipe	If purchase balance prompting is on for this tender transition to PurchaseBalance. Else if PIN encryption is on for this tender transition to GetPIN. Else if cash back Yes/No prompting is on for this tender transition to CBYesNo. Else if cash back is on for this tender transition to the state to get the configured cash back type (CBClerk, CBKeyboard or CBButtons). Else if frequent shopper is on for this tender transition to FreqShopper. Else transition to Wait.
	Cancel	Transition to IDLE
	Bad card swipe	Display BADSWIPE form and stay in this state.

State	Event	Action
PurchaseBalance	Init	Display the "purchase balance" form for the current tender.
	Button	F1 – (Purchase) or F2 – (Balance) – If PIN encryption is on for this tender transition to GetPIN. Else if frequent shopper is on for this tender transition to FreqShopper. Else transition to Wait.
	Cancel	Transition to IDLE

State	Event	Action
CBYesNo	Init	Display the "cash back yes/no" form for the current tender.
	Button	F1 – (Yes) If cash back is on for this tender transition to the state to get the configured cash back type (CBClerk, CBKeyboard or CBButtons). F2 – (No) If frequent shopper is on for this tender transition to FreqShopper. Else transition to Wait.
	Cancel	Transition to IDLE.

State	Event	Action
CBButtons	Init	Display the "cash back" form for the current tender
	Button	F1 through F9 – If frequent shopper is on for this tender transition to FreqShopper. Else transition to Wait. F10 – Transition to CBKeyboard.
	Cancel	Transition to IDLE

State	Event	Action
CBKeyboard	Init	Display the "cash back" form for the current tender.
	Amount entered	If frequent shopper is on for this tender transition to FreqShopper. Else transition to Wait.
	Cancel	Transition to IDLE.

State	Event	Action
CBClerk	Init	Display the "cash back" form for the current tender.
	Timer expires	If frequent shopper is on for this tender transition to FreqShopper. Else transition to Wait.
	Cancel	Transition to IDLE.

State	Event	Action
FreqShopper	Init	Display FREQSHPFRM.
	Card swipe	Transition to Wait
	Cancel	Transition to Wait
	Bad card swipe	Display BADSWIPE form and stay in this state.

State	Event	Action
GetPIN	Init	Display the "PIN" form for the current tender.
	PIN entered	If cash back Yes/No prompting is on for this tender transition to CBYesNo. Else if cash back is on for this tender transition to the state to get the configured cash back type (CBClerk, CBKeyboard or CBButtons). Else if frequent shopper is on for this tender transition to FreqShopper. Else transition to Wait.
	Cancel	Transition to IDLE

State	Event	Action
Wait	Init	Display WAITFRM.
	Cancel	Transition to IDLE